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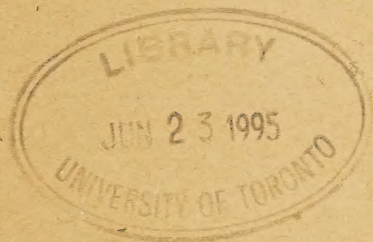
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NATURAL RESOURCES CANADA

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VOL. 4

JANUARY, 1925

No. 1

CENTRAL HEATING CAN BE EMPLOYED TO GREAT EXTENT*

DOMINION FUEL BOARD COMPLETES INVESTIGATION

Low-grade Fuels Can Be Utilized in Central Plants—A Service of the Future

That central and district heating can be profitably employed to a considerable extent in Canada and that the supplying of heat as a public utility in the denser sections of cities and towns may be looked for as a general service of the future are among the salient points brought out by the investigation into central heating recently completed by the Dominion Fuel Board. A widespread interest was found in the subject and much information, of practical value in the consideration of any particular application, has been compiled and is contained in the Board's report.

The present high cost of fuel and the frequent disturbances in domestic fuel supplies have led to considerable attention being given to possible economies and benefits to be derived from centralized heating. In almost every civilized country, during some period of the year artificial heat is needed in dwellings, and buildings required for modern social and commercial life. The supply of such heat becomes a very large, in fact a vital, factor to contend with in northern climates where temperatures are low during the winter and where the heating season extends over more than half of the entire year. Under these conditions, efficient and economical methods of heating and utilization of fuels are of particular importance, and demand the most careful attention and study, both from the standpoint of the conservation of fuel and other natural resources, and of the health, comfort, and budget of the country and the individual.

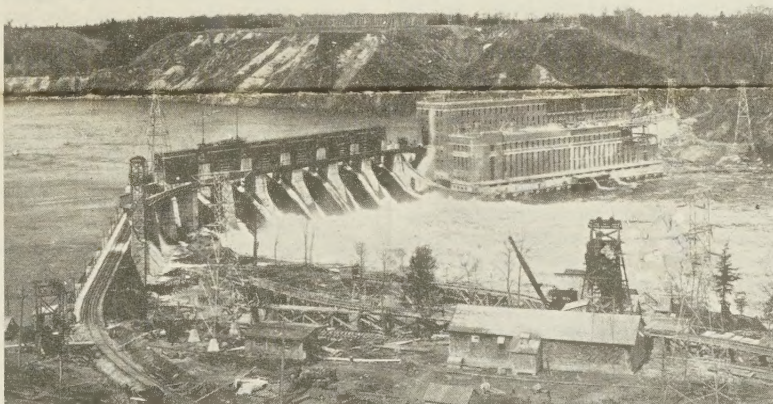
Particularly is this the case in Canada where nearly forty per cent of the entire coal consumed is used for heating and where over sixty per cent of the total coal consumed is imported, in spite of the fact that the Dominion possesses immense resources of coal within her own borders. Economic and geographic conditions have necessitated the importation of the large percentage of coal. The most highly industrialized section of the country is in the provinces of Ontario and Quebec where there is an abundance of water-power

1924 WATER-POWER DEVELOPMENT

Honourable Charles Stewart, Minister of the Interior, Reports Substantial Progress—Developments Completed

The Minister of the Interior in his annual statement regarding the development, distribution and use of hydro-electric energy in Canada, reports an exceptionally substantial growth during 1924. More than 300,000 horse-power of new installations were added during

the year. Practically the whole industrial activity of the Dominion is based upon power produced from water and when we consider the output of a single manufactured product, such as paper, or of the production of Canadian mines which water-power makes possible, it is



Water-Power Development in 1924—Power-house and dam construction at the La Gabelle development on the St. Maurice river, Quebec. This was one of the big installations of the year.

the year, involving some \$45,000,000 in capital expenditure and bringing the total installation in the Dominion to a figure of 3,569,275 horse-power. This does not, however, give a complete picture of the situation as many large projects were carried well toward completion and will when finished in 1925 bring a further addition of 600,000 horse-power to the country's total. This indicates remarkable progress and is concrete evidence that the advantages to be secured from the development of low-priced and lasting power are being realized and exploited throughout the Dominion in a way that should provide a decided impetus to industrial development in the near future.

During the past year the First World Power Conference was held in England and the fact that, including the British Dominions, some 40 countries participated therein is significant of the influence of motive power in modern life. It has been stated that the real wealth of any country lies in the capacity of its resources to make every sphere of activity economically justifiable and in so far as Canada is concerned it is water-power that has had possibly the greatest single influence in this direc-

tion. Practically the whole industrial activity of the Dominion is based upon power produced from water and when we consider the output of a single manufactured product, such as paper, or of the production of Canadian mines which water-power makes possible, it is

evident that water-power is qualified to share with agriculture the basic role in our national prosperity. The year just past gave ample evidence that power development is proceeding apace and that it will become an even greater contributor to the real wealth of the Dominion.

A brief review of the principal activities indicates that work was carried forward in practically every province with the projects of largest magnitude in Quebec and Ontario.

Quebec led in installations added during the year with some 175,000 horse-power comprised chiefly in the developments of the St. Maurice Power Company on the St. Maurice river, the Northern Canada Power Company on the Quinze river and the Montreal Light, Heat and Power Consolidated at its Cedars plant on the St. Lawrence river. There were also numerous large projects nearing completion among which may be mentioned, the Duke-Price Power Company development on the Saguenay river, the Hemming Falls development of the Southern Canada Power Company on the St. Francois river and the Ottawa River Power Com-

(Continued on page 3)

CANADA PROMINENT AT INTERNATIONAL MEETING IN SPAIN

THIRTY-TWO COUNTRIES WERE REPRESENTED

Interior Department Official Elected on Committee at Union of Geodesy and Geophysics Assembly

Canada took a prominent part in the deliberations at the Second General Assembly of the International Union of Geodesy and Geophysics held at Madrid, Spain, last fall. Mr. Noel J. Ogilvie, D.L.S., M.E.I.C., Director of the Geodetic Survey Branch of the Department of the Interior, and acting President of the National Committee of Canada of the International Union, represented the Dominion at the various meetings. The object or purpose of the Union is to promote the study of problems relating to the shape and physics of the earth; to initiate and organize the conduct of researches which depend on co-operation between different countries and provide for their scientific discussion and publication; to facilitate particular researches, such as the comparison of instruments and methods used in different countries. The National Committee of Canada of the Union was formed in 1920 by the Canadian Honorary Advisory Council for Scientific and Industrial Research.

The first meeting of the General Assembly was opened by the King of Spain in the Palace of the Chamber of Deputies. One hundred and seventy-two delegates, representing thirty-two countries, attended dividing their attention among the various sections of the Union in about the following ratio: Geodesy, 65; Seismology, 15; Meteorology, 18; Terrestrial Magnetism and Electricity, 24; Physical Oceanography, 28; Volcanology, 10; and 12 to the new section, partly organized, of Scientific Hydrology.

The first part of the meeting was taken up by the delegates, who gave accounts of the work accomplished in their respective countries since the first meeting of the International Union held in Rome in 1922. Then, a large part of the remainder of the time was occupied in completing the organization started at Rome and the reading of scientific papers. A number of special committees were formed to report on improvements on instruments and methods of carrying out scientific work in the various countries of the Union.

There were four outstanding features of the Conference: first, a committee

(Continued on page 4)

*Prepared from material supplied by the Dominion Fuel Board, Ottawa.

(Continued on page 2)

"THE CALL OF UNTRODDEN WAYS"

Recent National Parks Publication Contains Vivid Description of Trip Through Jasper Park

"The Call of Untrodden Ways," recently issued by the Canadian National Parks Branch, is a spirited account of a summer outing in Jasper National park in northern Alberta. The writer, Rev. G. D. Kilpatrick, of St. Andrew's Presbyterian church, Ottawa, is a lover of the mountains and an advocate of the great outdoors. He has succeeded in conveying this spirit in a striking manner to the readers of this publication.

In form this booklet rises to the standpoint of excellence usually set by the National Parks Branch of the Department of the Interior in its publications. The cover design is striking and harmoniously blended in colour. This delightful little booklet offers something different, in contrast to ordinary scenic



"The Call of Untrodden Ways"—Camp scene in the shadow of mount Erebus, near Chrome lake, in Jasper National park.

descriptive literature. It leans towards the humanitarian and the spiritual, embodying in a marked degree the motive prompting National Parks inception.

The text deals not so much with the outstanding scenic features of this national reserve or the individual points of interest, as with the benefits that are to be obtained through direct association with nature. It is a splendid effort at bringing home to Canadians the realization that the wonders of their native land are lying unappreciated at their very doors.

The reader is taken on a trail trip through the mountains, and a vivid description is given of the beauties of the everchanging panorama attending such a journey. The daily routine of the pack-train is set forth in a description that draws and holds interest and inspires a desire to participate in such an outing. Even the inclusion of a description of one of the terrific, though brief, mountain storms adds to the wonder of the journey.

The illustrations are excellent as representing the primeval scenery of the unblazed trails in this, one of our greatest and most extensive wonderlands. The references to the flora and fauna will prove of great interest to all nature lovers.

Estimates of the total number of the various classes of live stock in Saskatchewan in 1924 follow: horses, 1,170,517; cattle, 1,528,421; sheep, 123,326; swine, 992,424.

CENTRAL HEATING CAN BE EMPLOYED TO GREAT EXTENT

(Continued from page 1)

for the generation of electricity. These provinces are fairly close to the large anthracite and bituminous coal-fields of the United States, but a considerable distance from Canadian coal areas. Hence the bulk of the imported coal is used in these provinces.

Various methods of heating have been adopted and developed in different countries dependent upon the climatic conditions and the requirements and progress of the inhabitants. The tendency in recent years, especially on the continent, has been towards centralization of heating plants the heat being distributed through pipes by the medium of steam or hot water to serve groups of buildings, or, as a public utility, entire sections of cities. As a general utility service, central heating replaces the wasteful methods of burning fuel in a multitude of small heating units. Each progressive step in other public services has involved an increased cost to the user, but the additional comfort and convenience therefrom have been sufficient to warrant a general adoption. So with the supplying of heat. The advantages of district heating are apparent and in general may be stated as being, to the user: cleanliness, comfort, health, convenience, safety, and saving in space and furnace equipment; and to the community: economy in fuel consumption, possible use of low-grade fuels, and appreciation in rental value of property.

In many cases central or district heating can be advantageously combined with the generation of electricity from steam stations, the steam being supplied for heating after it has passed through the engines or turbines driving the electric generators. In addition to actual heating service steam can also be supplied from large central stations for the requirements of laundries, hotels, manufactories, and for miscellaneous industrial purposes with the same advantages, and as a rule at a lower cost than steam generated by small independent boilers. However the introduction of central heating in any particular locality should be preceded by a detailed and careful study of local conditions and of the factors bearing upon the problem in order that there may be reasonable assurance of financial success.

Central heating has been adopted in Canada to a considerable extent for groups of institutional buildings. As representative of the large central heating installations may be mentioned the University of Toronto (27 buildings); the Parliament Buildings, Ottawa (7 buildings); McGill University, Montreal (9 buildings); Alberta University, Edmonton (18 buildings); and Queen's University and Kingston Hospital, Kingston (22 buildings). Examples of community heating in Canada are to be seen principally in the cities of Toronto and Montreal.

Although the application of methods of centralized heating alone may not be looked upon as a considerable factor in the solution of the "Fuel Problem" in the provinces of Ontario and Quebec,

HONEY PRODUCTION IN CANADA*

Industry Is Spreading To All Provinces of the Dominion—Quality Is Unsurpassed

The saying "the resources of Canada are inexhaustible" is true of no food product more than of honey. From coast to coast there is an abundance of nectar-secreting flowers, which produce each year large quantities of nectar that only bees can gather and conserve as honey for the use of man. If bees are not present to gather this harvest, it is wasted and it is no exaggeration to say that millions of pounds remain ungathered each year throughout the Dominion. The abundant sources of nectar and the high average of favourable weather for its secretion and in gathering make Canada a wonderful country for the beekeeper.

The bulk of Canadian honey is unsurpassed in quality and it has become a staple article of food in many places, selling readily at satisfactory prices. In open competition with the world Canadian honey captured first, second, and third prizes at the Dairy Show in London, England, this year. This is the third time that the first prize has been awarded to Canada.

Honey production has been long a profitable occupation in Ontario and Quebec. The amount produced by these two provinces, in an average year, is estimated at between 15 and 16 million pounds. British Columbia has also been a producer for many years and in 1922 the crop was 177,839 pounds. In 1922 one apiary in the Fraser River valley, B.C., yielded an average of over 300 pounds per colony and one colony yielded over 600 pounds, while the Experimental Apiary at Agassiz, B.C., had an average of 194 pounds and in 1923 182.1 pounds per colony.

The last few years have seen a decided development in the three Prairie Provinces. Manitoba, in three years, has increased production from 500,000 to over 3,000,000 pounds. This amount will be multiplied several times as the industry develops. Saskatchewan and Alberta are just beginning to realize their possibilities in this direction and the number of beekeepers in these provinces is steadily increasing. Conditions on irrigated areas of southern Alberta, where alfalfa is grown extensively, are especially favourable for the production of honey. The Dominion Experimental Farm Apiary at Lethbridge has for the past six years produced on an average 144.8 pounds per colony, while in 1923 the average was 189.9 pounds and one colony produced over 472 pounds. The bee-keeping industry is as yet only in its infancy in these two provinces and will expand as sweet clover is grown more extensively.

In the more northern parts of British Columbia and Alberta there are vast areas covered with fireweed, which is one of our greatest nectar-secreting flowers. These areas offer great possibilities for the beekeeper.

Comparatively few bees are kept in the Maritime Provinces. However, the

nevertheless the replacement of small anthracite-burning units by centralized plants burning low-grade fuels will contribute towards the reduction in importations from the United States of high-priced anthracite coal which is so rapidly becoming a luxury fuel of indeterminate availability.

records from these provinces indicate that good crops are obtainable. The apiary at the Experimental Farm, Nanpan, N.S., gave in 1922 an average of 165.3 pounds and in 1923 114.8 pounds per colony. Other apiaries have reported averages of 100 pounds and over.

The early sources of nectar, over the greater part of Canada, are the willows, maples, dandelion and fruit bloom. In the eastern provinces these are followed by alsike and white dutch clovers, sweet clover, basswood, and buckwheat, from which the main crop of honey is obtained. In the Prairie Provinces the bulk of the crop is obtained from various sources; sweet clover, alfalfa, sow thistle, and wild prairie flowers. In British Columbia fruit bloom, clover, and fireweed are important early sources while golden-rod and wild aster are two important fall flowers.

The main problems confronting the beekeepers of Canada are wintering, disease, and swarm control. Although our winters are comparatively long and usually severe, bees can be wintered in cellars or packing cases, provided the proper attention is given them. All the provincial governments have foul brood laws and inspectors are employed to locate and aid in the control of bee diseases, of which those affecting the brood are the most serious.

The time when success in beekeeping was measured by the number of swarms hived has passed, and natural swarming is rapidly being replaced by successful measures of swarm control and controlled increase. The Dominion Experimental Farms system, through its Bee Division, has established 21 experimental apiaries throughout the Dominion, at which experimental work is being conducted for the benefit of the beekeepers of Canada.

*Prepared under the direction of Dr. J. H. Grisdale, Deputy Minister of Agriculture, by Mr. G. B. Gooderham, Dominion Apiarist.

The attention of persons keeping Canada geese or ducks of wild species in captivity is called to the fact that a permit from the Department of the Interior is required for the lawful keeping of such game birds. There is no charge for such a permit and those without permits should communicate at once with the Canadian National Parks Branch, Department of the Interior, Ottawa, giving the full name and address, the kind and number of ducks or Canada geese in his possession, and the area and location of the land where these birds are kept and whether it is owned or leased.

"Fire prevention outweighs in importance all other factors in securing adequate forest fire protection. No forest authority can cope with the situation developing under adverse conditions without the wholehearted support and co-operation of the general public. In education and publicity, beginning with the children in the schools and extensive enough to reach all classes of the population, lies the only hope of attaining adequate forest fire protection." Report of the British Empire Forestry Conference, 1923.

NATURAL RESOURCES
CANADAPUBLISHED BY
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Minister
W. W. CORY, C.M.G.,
Deputy Minister

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OTTAWA, JANUARY, 1925

1924 WATER-POWER

DEVELOPMENT

(Continued from page 1)

pany's development on the Ottawa river near Bryson.

Ontario came second with some 132,000 horse-power added during the year. Most of which was comprised in the work being carried out by the Ontario Hydro-electric Power Commission, notably at its Queenston-Chippawa development on the Niagara river, the Cameron Falls development on the Nipigon river and smaller developments on the Trent, Muskoka, Beaver, and South rivers. Considerable activity also took place in the Northern Ontario mining field, the principal new development being that of the Hollinger Consolidated Gold Mines Limited, on the Abitibi river. Other work of considerable magnitude was completed by the Canadian Niagara Power Company at Niagara Falls and the Backus-Brooks Company at Kenora.

In other provinces many activities of importance were also carried on. In Nova Scotia, more than 7,000 horse-power were added during the year, chiefly in the development of the Nova Scotia Power Commission on the East River Sheet Harbour. In New Brunswick the New Brunswick Electric Power Commission energetically pursued its studies at Grand Falls on the St. John river. In Manitoba the city of Winnipeg had work in progress which will add considerably to the capacity of its plant on the Winnipeg river. In Alberta, the Canadian National Parks Branch, Department of the Interior, completed and brought into operation its plant on the Cascade river to serve Banff. In British Columbia no new installation was added during 1924 but extensive works were under way by the British Columbia Electric Railway Company in the Stave Lake region and by the West Kootenay Light & Power Company on the Kootenay river which will be effective in increasing the total installation in the province during 1925.

In addition to these activities numerous projects were commenced or are in immediate prospect which should keep abreast of the demand for power and maintain the healthy growth which has existed during the past few years.

It is estimated that the wholesale value of the commercial crop of all fruits in 1923 was \$33,169,143.

The production of pig iron in Canada during the eleven months ended November, 1924, was 570,480 tons.

MINERAL RESOURCES OF MANITOBA*

Development in Metallic and Non-metallic Groups Being
Proceeded With—Encouraging Results

Manitoba's mineral resources include representatives of both the metallic and non-metallic groups. The known metal resources of most promise within the province are gold and copper; gypsum, salt, clay, and building stone are among the important non-metallic products.

Development to date of the gold and copper resources has been chiefly in the southeast Manitoba and The Pas mineral belts. These two mineral belts are but a few miles within the southwest edge of the extensive area of folded Pre-cambrian rocks comprising the Canadian Shield, which includes the north-eastern two-thirds of Manitoba and about 60 per cent of all Canada. In contrast to these ancient folded Pre-cambrian rocks are the comparatively young, nearly flat-lying post-Cambrian rocks which underlie the prairies in the third of the province that lies south and west of lake Winnipeg. The salt, gypsum, and other non-metallic deposits are associated with these younger strata. The fertile soil overlying these younger formations has also been incentive for the rapid peopling of the province. Large areas still await settlement but some of these require to be cleared and drained. The agricultural opportunities have been the magnet that drew population and supplied it with food, while now increasingly the rocky formation is being looked to for fuel, construction materials, and other necessities of our complex civilization.

Building stones are found in the limestones underlying the lake region and limestone quarries were opened years ago at Tyndall and Stonewall. So attractive is this material that it was employed as facing material for the interior walls of the new Parliament Buildings at Ottawa. This same region has also provided lime. Gypsum for plaster is mined in the vicinity of lake St. Martin. A natural cement stone in the Pembina escarpment has been utilized in the making of cement. Brick clays of various grades occur throughout the province and from the shales of the western part of the province, material for making better grades of vitrified ware is procured.

Reafforestation of the open country is providing a portion of the summer fuel, but the low-grade lignites in the southern part of the province may also contribute to the fuel supply. A potential asset, at present not economically available, exists in the oil shales which underlie a large area in the western part of the province. As these are very low grade their only present usefulness is in providing in a few areas small supplies of natural gas.

Geological work by the Geological Survey of Canada in the Canadian Shield of northern and eastern Manitoba indicates that it contains various patches of rocks generally similar to the rocks underlying mineralized areas in northern Ontario and Quebec, of which the Rice Lake and Pas mineral belts are the best known. Other similarly mineralized belts may yet be discovered in the large unprospected or partially

*Prepared under the direction of Dr. Charles Camell, Deputy Minister of Mines, by D. B. Dowling and J. F. Wright, of the Geological Survey.

prospected favourable areas farther east and north.

As known at present the mineral belt of southeastern Manitoba extends east from the south end of lake Winnipeg to the Manitoba-Ontario boundary and north from Winnipeg river to a few miles north of Wanipigow river. Within this area of about 2,500 square miles the three important prospecting areas are the Rice Lake gold area to the north, Maskwa River nickel-copper area in the centre, and Oiseau River copper area to the south.

Rice Lake gold area includes about 500 square miles. To date the most extensive development is at Selkirk mine where exploration has reached a depth of 510 feet and approximately 2,000 feet of drifting has been completed. The Wad Syndicate, on the Hope-Kitchener group, and the Anglo-Canadian Explorers, of the Oro Grande group, have completed extensive surface developments, and are making plans to diamond drill their veins this coming winter. The Montealm-Tine, the Pilot-Smuggler, the Mildred, and the Eldorado prospects may be mentioned among other fairly promising looking prospects.

Maskwa River nickel-copper area covers about 25 square miles and is about 15 miles south of the gold area. The nickel-copper mineralization is similar in type to that at Sudbury though much smaller. Some diamond drilling has already been completed on the Mayville claim and a considerable body of low-grade ore is reported. A considerable portion of Maskwa area is drift-covered and can be most successfully prospected with a light diamond drill equipment.

Oiseau River copper area is 15 miles south of Maskwa River area and the mineralized belt, 1 mile wide and 18 miles long, extends from the east end of Lac du Bonnet north and parallel to Oiseau river to the west end of Oiseau lake. The most extensive prospecting is in progress by the Manitoba Copper Company on their group of claims covering about two square miles and located about 5 miles west of Oiseau lake. At one place on the Cup Anderson claim, the commercial ore zone is 70 feet wide. Although there are several known lenses of ore from 10 to 20 feet long and 6 to 8 feet wide that assay from 12 to 15 per cent copper, the average ore will probably run about 3 per cent copper, \$1 in gold and 2 or 3 ounces of silver to the ton. The ore can be concentrated to a 25 per cent copper product. Not enough diamond drilling has yet been completed to determine if the ore-bodies are large enough to warrant the building of a concentrator.

Although no large tonnages of gold and copper ore have yet been proven on any claim in southeast Manitoba, the results of the preliminary prospecting already completed have not been in all cases discouraging. It is believed that more development work will demonstrate considerable tonnages of ore on several of the known prospects and that in the future other ore-bodies will be discovered by extensive drilling. If ore-bodies should be found they will be fortunately situated with respect to power and transportation, as no part of the district is over 60 miles, and the

COMPLETE WIRELESS TO YUKON

Wireless communication between the Northwest and Yukon Territories and other parts of the Dominion was officially inaugurated at midnight, December 5, when the first message, signed by Hon. Charles Stewart, Minister of the Interior, was transmitted from Ottawa to Dawson. The recent completion of the southernmost terminal at Edmonton opened the way for the inauguration of the new service, the stations at Fort Simpson and Dawson having been already put in operation.

The Canadian Corps of Signals, in co-operation with the North West Territories and Yukon Branch, of the Department of the Interior, installed the wireless apparatus in the four stations completed, namely, Edmonton, Fort Simpson, Mayo, and Dawson. Work on the northernmost station, that at Herschel, had to be postponed owing to the loss of equipment and supplies with the steamship *Lady Kindersley*.

Maskwa and Oiseau River areas are within 20 miles of the Manitoba Power Company's large power plant at Great Falls, on Winnipeg river.

The Pas mineral belt is situated between latitude 54° 30' and 55° and longitude 99° 30' and 102° and includes about 5,000 square miles. Prospecting has been active in this area since 1913 and the chief discoveries are the gold prospects on Amisk lake, the Flin Flon and Mandy copper deposits northwest of Athapapiskow lake, and the gold prospects on Elbow and Wekusko lakes. The route to the mineral prospects in the southwest corner of the area is by steamer from The Pas up Saskatchewan river to Sturgeon Landing and from this point by wagon road and canoe. The east end of the mineral belt can easily be reached by wagon road and canoe from Mile 82 on the Hudson Bay railway.

The large developed deposits are the Flin Flon and Mandy copper properties, owned by the Mining Corporation of Canada. The results of their diamond drilling of the Flin Flon ore-body indicate 16,000,000 tons of ore averaging 1.9 per cent copper with a trace of gold and silver. Between 1917 and 1920 over two million dollars worth of copper was produced from the Mandy property. However, before the Flin Flon and Mandy properties can be mined, about 85 miles of railway from The Pas, a power plant, and a smelter will have to be built. Prospecting has been active in the vicinity of these deposits, but up to the present no other commercial deposits have been discovered and unfortunately fluxing material for smelting is scarce near the ore-bodies.

In the vicinity of Wekusko lake, the Mining Corporation of Canada, Limited, is developing the Rex gold property and the Bingo Gold Mining Company, the Bingo deposit. The information kindly furnished by the Mining Corporation, indicates that this company is prospecting the Wekusko area thoroughly as throughout the year they have had from 60 to 70 men at work under the direction of competent mining engineers. They have dropped all their options except the Rex, where at the end of this year they plan to have the main shaft to a depth of 419 feet, and have already drifted 400 feet on the 200-foot level, and plan to drift 1,000 feet on the 350-foot level. On the Bingo property the shaft is 400 feet deep and about 1,000 feet of drifting has been completed. The prospect is now being thoroughly investigated.

REMARKABLE WORK DONE BY AERIAL SURVEY IN CANADA

COMPLETE FLIGHT OF OVER
2,810 MILES

Extensive Operations Carried on In
Northern Manitoba and Saskatchewan
This Year

Further evidence of the value of aerial photography in the speedy and more accurate production of maps of the little-known regions of the Dominion was supplied by the recent flight taken by a member of the staff of the Topographical Survey of Canada, Department of the Interior, from Victoria Beach, Manitoba, through northern Manitoba and Saskatchewan. The operations were carried out in co-operation with the Royal Canadian Air Force and during the flight, which covered approximately 2,810 miles, over 1,700 photographs were taken. Ground traverse work was also conducted by the Topographical Survey and upon the completion of the latter it will be possible to plot an area of about 15,000 square miles. The flight occupied nearly four weeks but owing to unfavourable weather conditions only forty-four hours and ten minutes of actual flying was done.

The flight represents one of the most brilliant achievements in the history of aviation and reflects considerable credit upon the officers of the Air Force who were responsible for keeping the plane in good operating condition. The distance travelled and the area photographed demonstrates clearly that in no other way can the surveyor hope to cover unmapped and remote territory with such ease and rapidity. The visibility on a clear day is so good that well defined points, such as prominent headlands, or fairly large bodies of open water, can be readily distinguished at a distance of forty miles or more from an elevation of 5,000 feet. It is just here that the air traveller gets one of his greatest advantages over the man on the ground. The latter cannot jump from one easily identified point to the next, often many miles distant, but must follow the water course in all its intricate details.

The difficulties confronting the Topographical Survey of Canada in mapping large areas in northern Canada are well known. The demands for better maps for settlement, mining, and forestry purposes are constantly growing. The slow progress of surveys by ground methods, with what might be termed their incomplete results, made experiments in aerial photography advisable and, in co-operation with the Royal Canadian Air Force, efforts were made to determine whether methods of aerial survey could be evolved which would give greater speed, with less work and more complete results. With this in view, in the fall of 1923, a small area north of The Pas, Manitoba, comprising part of the Kissinging sheet of the Sectional Map of Canada, was photographed by methods laid down by the Topographical Survey. The test showed that providing oblique photographs could be taken under satisfactory light conditions, at definite angles, with proper intervals, and at known heights, a reliable map could be produced which, with a minimum of ground work to control the



Aerial Surveying—View of Reindeer lake, situated on the interprovincial boundary between Manitoba and Saskatchewan. A comparison between maps in current use and the above illustration will show the extent of error in maps of Northern Canada.

pictures, would be more complete and accurate than any ground survey which could be contemplated in that area for many years. The field work, moreover, could be completed in a few weeks as against many months of hard travel by canoe.

The present flight started on July 18 from Victoria Beach and four hours later the plane reached The Pas from which point the actual photographic work was begun. Fuel for the operation of the machine had been shipped to several points during the winter months, and since the total allowable load was 5,600 pounds and the combined weight of the pilot, engineer, photographer, and navigator, and the camera, equipment, and supplies was 5,863, it was found necessary to begin the flight without the aeroplane's wheels and tailskid. Weather conditions interfered and it was not until July 20 that photographic work was started 25 miles north of The Pas. Pukatawagan was reached the same day, and a start for Rabbit River was made on the 23rd. The machine operated on Reindeer lake until August 1, with Rabbit River as the base. Surveyors running the ground traverse from which the photographs will be plotted were met in the Reindeer Lake district and were given some very useful information about the country. The party left Rabbit River for Stanley Mission but owing to unfavourable photographic weather encountered, the course was changed to Pelican Narrows, from which point a report was forwarded to the Head Office at Ottawa. They resumed flight on August 11 from Ile-a-la-Croix, later continuing on to Prince Albert. The following day they left for The Pas and on August 14 reached Victoria Beach.

Aerial operations were also conducted during the year in other parts of Canada where mapping operations were under way and where the forest and mineral resources were being investigated. This particular flight and the ground surveys with which it was connected were for the purpose of preparing a base map for geological investigations of northern Saskatchewan. Upon the completion of the map the photographs will be available for the use of the geologist, the forester, and the water-power engineer for study and use during actual ground investigation. The aerial surveys being performed by the Topographical Survey, therefore, have a two-fold value, the first mapping and the second providing actual photographs for study and investigation by experts engaged in developing Canada's natural resources.

During the flight food, of which there was no shortage, consisted mostly of

bacon and canned goods, with bannock to replace bread. There was little meat available, but plenty of fish. Moose meat was extremely scarce. The residents attribute this to the absence of flies in the north country this year, consequently the moose were not driven to the water, as in other seasons. Since the Indian does not leave his canoe but always hunts by paddling up the waterways, very little meat was obtained. The large herds, numbering thousands, of caribou and reindeer which move about in the district during the winter had all moved north to their summer grazing grounds in the "barren lands" by the time of the party's arrival.

CANADA PROMINENT AT INTERNATIONAL MEETING IN SPAIN

(Continued from page 1)

was formed to carry out or establish a longitude net around the world by wireless, to be used in checking the size and figure of the earth. Mr. Ogilvie had the honour to be made a member of this committee. The delegates all seem to have great respect for Canada and work being done here. The second outstanding feature was the adoption of the Hayford ellipsoid of 1909 as a standard of reference for all countries. There was some opposition to the adopting of the Hayford ellipsoid, as it was thought that the United States and Canada cover too small an area of the earth's surface to calculate an improvement on the other ellipsoids now in use. The third outstanding feature was the paper presented under the section of Oceanography by Admiral Sir John Parry, on the Gulf Stream, which was prepared by one of our distinguished Canadian scientists, Dr. W. Bell Dawson, whose name is known in every country as one of the greatest authorities on tides and currents. The fourth outstanding feature was the discussion on the determining of distances between two points by the velocity of light.

Before returning to Canada, Mr. Ogilvie visited a number of scientific institutions in Spain and excursions were planned by the National Committee of Spain for the delegates to visit a number of places of interest in the south of that country.

The next meeting of the International Union will be held in Prague, Czechoslovakia, in 1927.

The number of cattle on farms in Canada in 1923 totalled 9,246,231, of which 3,659,365 were classified as milch cows and 5,586,866 as other cattle. The number of sheep was 2,753,860; swine, 4,405,316, and poultry, 45,469,282.

EXTENSION OF GOOD ROADS IN NATIONAL PARKS

JASPER-EDMONTON HIGHWAY
NEARS COMPLETION

Road Maintenance and Improvement Work
An Important Item—Other Projects
Under Way

The importance of maintaining and extending the motor roads and trails in Canada's National parks appears to have been the dominating note in the construction work carried on by the Parks' authorities during the 1924 season. The greatly increased traffic which resulted from the opening of the new Banff-Windermere highway gave further evidence of the great value of improved motor roads and maintenance and improvement work was given first consideration last season.

A large item of new work in Jasper park was the construction of six miles of the spectacular Edith Cavell road, completing it to Cavell lake, about one and a quarter miles from the ice of Ghost glacier. Rugged country, most unfavourable to construction operations, was traversed and a very good showing was made. Surfacing operations on that section of the Jasper-Edmonton highway in Jasper park were carried on over twelve miles of new road from the town of Jasper easterly. This section comprised abandoned railway grade which has now been converted into a first-class highway. On this highway a bridge of three 109-foot spans was erected over the Snaring river, and work commenced on a bridge of six similar spans over the Athabaska river.

Other works of major importance were also carried on to completion. During the summer the power-house building of the Cascade development near Banff, which has been in operation since February supplying power for the town of Banff and vicinity, was completed in its aesthetic details. Every effort was put forth to make its appearance as neat and attractive as possible and in harmony with the surroundings. Two cottages were erected for the accommodation of the resident operators and these were also artistically designed. Good progress was also made on the golf courses in Banff park, where the eighteen holes were completed in time for the opening of the playing season; and in Jasper and Waterton Lakes parks. Eight miles of the right-of-way of the proposed new road between Lake Louise in Banff park and Field in Yoho park were cleared during the late fall. Some important rock excavation and crib work was undertaken on the Yoho Valley road through the canyon of the Yoho river. To meet the growing demands of motor tourists to Waterton Lakes park and to serve the townsites, a summer water supply system was installed.

Other lines of construction work undertaken by the Canadian National Parks Branch included the erection of historic site memorials throughout the Dominion. A field stone cairn with bronze tablet attached was placed on each of fifteen sites, and large boulder memorials were erected on two other sites.

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AMICABLY ADJUST THE HUDSON'S BAY COMPANY'S CLAIM

LONG STANDING DISPUTE IS SETTLED

Ownership of Nearly One Million Acres of Land in Western Canada Was in Question

The amicable settlement of the Hudson's Bay Company's claim to certain lands in Western Canada was announced recently by Hon. Charles Stewart, Minister of the Interior. This contentious matter, which dates back to the year 1869, involved nearly a million acres of land and its adjustment is naturally gratifying to both the officials of the Department of the Interior and of the Company.

Under the deed by which it surrendered its ownership to Rupert's Land, comprising what is now known as the Prairie Provinces, the Company claimed it was entitled to nearly 7,100,000 acres of land. After negotiations with the officials of the Department of the Interior, the Company agreed to accept nearly half a million acres less in settlement of its claim.

For nearly two centuries, by virtue of the grant made it by King Charles of England, the Hudson's Bay Company, controlled the country west of the Great Lakes. In 1869 the Company agreed to surrender this vast territory to the Dominion Government in return for a sum of money and one-twentieth of the land in the "fertile belt set out for settlement." This "fertile belt" was defined by the deed of surrender as consisting roughly of the territory between the Canadian Rockies and the lake of the Woods south of the Saskatchewan river.

What constituted land "set out for settlement" proved to be the bone of contention in implementing the terms of the deed of surrender, especially in regard to Indian and forest reserves. The Company contended that these lands came under the terms of the deed, while the Government held that these lands were not "set out for settlement."

Not only was the dispute one of long standing but the matters involved were of a complicated nature. At one time it was thought that settlement could be reached only through a court action, a measure which would have entailed further delay and considerable cost. With praiseworthy foresight, the representatives of both sides took counsel together and after a period of negotiation, succeeded in arriving at a satisfactory solution of the problem.

THE NORTHERN PLAINS OF CANADA

Recent Investigations by Topographical Survey Reveal Unsuitability of Name "Barren Lands"

There has been a growing interest in recent years in the vast little-known stretches of Northern Canada which has extended to the open country beyond the timberline. In narratives and reports of travellers and explorers they have been given the name "Barren Lands" which originated in the Indian name meaning "a country without

is justified. If it is not found to be justified a more suitable one should be selected.

The interpretation of the Indian name "De-chin-u-le" (no trees) as "Barren Grounds" was made by Samuel Hearne who conducted in 1770-71 the first exploration into the country. His course to a large extent,



The Northern Plains of Canada—Map showing Western Canada with its three great divisions, the Western Plains, the Forest Lands, and the Northern Plains. The latter name is applied to that division now known by the misnomer, "Barren Lands."

trees." The interpretation is unfortunate and a misnomer unless justified by a sterile soil or a climate prohibiting the growth of vegetation. The word "barren" is an uncompromising one. Why seek for resources of value in a country branded in its very name as producing nothing? If this area were a small tract, its situation far from the settled portion of the country would tend to make it a matter of small importance by what name it was called. Actually there is an area lying between the timberline and tide-water in the Arctic ocean and Hudson bay of about 500,000 square miles or nearly one-seventh of the total of the Dominion, in addition to the great islands of the Arctic and a portion of northern Quebec.

The extent of country involved makes the question an important one worthy of serious attention. As an approach to the subject a survey of available records might be made to determine if the name "Barren Lands"

however, held to the edge of the forests and he only left this to make his dash north to the Coppermine and also when approaching Hudson bay. Moreover, he travelled the open country at unfavourable seasons. His name of "Barren Grounds," therefore, may be taken as a careless translation rather than a description. However, the name did carry an important idea affecting travel through the country by describing its lack of timber and fuel.

The various explorers who crossed the open plains during the early years of the last century, including Franklin and Back, accepted Hearne's name for the country and through their narratives a certain historical significance became attached to it. Their records do not present clear pictures of the country, dissociated from consideration of an accidental nature, which might modify or correct the unfavourable impression given by the name.

(Continued on page 3)

MARKED INCREASE IN PRODUCTION OF METALS IN CANADA

MINING ACTIVITIES OF PAST YEAR

Rise in Output of Metallics Offset By Falling Off in Non-Metallics— Outlook For 1925

During the year 1924 there was a marked increase in the production of metallic minerals in Canada. This increase was due mainly to a greater production of gold, lead, nickel, copper, zinc, and the platinum metals. It was offset, however, by a decided falling off in the value of non-metallic minerals produced, due in a great measure to a decrease in the output of coal. The production of metallic minerals for the twelve months of 1924 amounted to \$98,302,000 and of non-metallic minerals including structural materials and clay products to \$107,160,000.

The prosperity of the mineral industry is dependent on the general world prosperity. The recent trend of events points to a return to normal and prosperous industrial conditions and increased world trade. Clear sighted business men and financiers express confidence in the immediate future. The Canadian mining industry will profit from the stimulation of the market for minerals and metals that will ensue. A brief survey of the status of some of the leading branches of the mining industry follows. Canada produces a greater variety of minerals than most countries, but only a few of the more important can be touched upon in a short article of this nature.

Gold mining is a thriving and prosperous industry with bright prospects for the future. The greater part of Canada's 1924 output of 1,525,000 fine ounces valued at \$31,522,000 was derived from lode deposits and came from the provinces of British Columbia and Ontario, the latter producing four times as much as the former. Important developments have been announced from properties at the head of Portland canal which should result if they are as good as stated in an increase in the production of gold in British Columbia. Considerable interest is still shown in The Pas and Rice Lake mineralized belts of Manitoba lying respectively to the north of the Hudson Bay railway and east of the south end of lake Winnipeg.

In western Quebec there was much prospecting and intensive exploratory and development work in those geo-

(Continued on page 2)

THE LONGEST LINE OF LEVELS

Geodetic Survey of Canada Completes Line of Precise Levels 1,252 Miles in Length

The recent completion by the Geodetic Survey of Canada of a line of precise levels 1,252 miles in length, extending across northern Ontario and Quebec, constitutes what is probably a world's record, in that the levelling, from end to end of the line, was carried out by the same person Mr. G. E. B. Sinclair, a geodetic engineer on the staff of this Survey. So far as is known this is the longest continuous line of precise levels ever run by one person.

Precise levelling is the carrying of mean sea level datum to the interior of a country, that is the determination of the exact height above sea level by means of a precise levelling instrument. Mean sea level is determined by means of gauges maintained by the Tidal and Current Survey, Department of Marine and Fisheries, on the Pacific and Atlantic coasts. From the sea-coast the levelling engineer with his spirit level incorporated in a modern instrument called a precise level, works inland by means of a myriad of consecutive sighting stations, determining as he goes along just how far above sea level each new station is.

Starting in the spring of 1920 at the intersection of the Canadian Pacific and Canadian National railways' main lines near Rennie, Manitoba, some 70 miles east of Winnipeg, the levels followed the latter railway's transcontinental line through Sioux Lookout and Cochrane, Ontario, and La Tuque, Quebec, to the village of Hervey, whence a branch line of the same railway was followed to Grand Mère. From this point to Three Rivers the tracks of the C.P.R. were used and at Three Rivers the line was closed on bench-marks established some years previously.

When it is realized that the whole distance of 1252 miles was levelled, in sections, both in the forward direction—from west to east—and also in the reverse direction, some idea will be gained of the magnitude of the task performed by the precise levelling party. Assuming an average of nine set-ups of the precise level instrument to the mile, this operation was repeated more than 22,500 times in the course of the work, not taking into account that some seven per cent of the sections had to be re-run by reason of the agreement between the forward and backward levelling not being within the prescribed limits of accuracy on the first trial.

In each of the five field seasons from 1920 to 1924, inclusive, the line of levels was pushed ahead, the average period spent by the party in the field being four months per season. These comparatively short seasons were due in part to the somewhat severe climatic conditions obtaining in that part of the country, which render it difficult for a party engaged in precise work of this nature to carry on operations with full efficiency either in the early spring or late fall.

In the course of the levelling 577 permanent bench-marks were established, at an average distance apart of slightly less than 2½ miles. These were of the standard pattern of the Geodetic Survey of Canada—consisting of copper bolts set in culverts, bridge abutments, rock exposures, etc., and in special concrete monuments constructed at suitable intervals along the railway right of way, crossings of all the rivers and

more important streams one or more bench-marks were established, in the longer bridges a bench-mark being placed, as a rule, at each shore. These will prove of special value to engineers making investigations for water-power developments, etc.

Descriptions and provisional elevations of all the bench-marks are available upon application to the Director of the Geodetic Survey. The absolute elevations above mean sea level will not be fixed with finality until such time as the general level net of Canada is of sufficient strength to warrant an adjustment which may be held without change for an indefinite period. It may be stated, however, that the provisional elevations now available will probably not be altered by more than a fraction of a foot, and in any event the relative elevations of the adjacent benchmarks along any particular portion of the line will be practically unaffected.

MARKED INCREASE IN PRODUCTION OF METALS IN CANADA

(Continued from page 1)

logical formations which have proved highly auriferous in Ontario and which extend east into Quebec. The results have been encouraging. The examination of prospects is being undertaken by mining and exploration companies of good financial standing.

The production of silver during 1924 reached 20,363,500 fine ounces valued at \$13,644,000, which exceeded that for 1923 by 1,761,756 ounces. South Lorrain, Ontario, will profit from the service of a branch of the Timiskaming and Northern Ontario railway that has recently been built into that field. This will permit of the shipment of low-grade ores to the metallurgical plants of Cobalt for treatment. Efforts are being made to extend the market for silver by encouraging its use for coinage and for tableware and household ornaments. The great depreciation of the European currencies since the war led to the use of cheap alloys and nickel for coinage. A great many people prefer a coinage having an intrinsic value and it may be that as financial conditions become stabilized there will be a return to the use of the precious metals.

The nickel industry has shown great activity and in spite of low prices resulting from keen competition there has been a big increase in production, the 1924 figures reaching 69,250,000 pounds valued at \$18,697,500. There are now but two companies carrying on mining operations.

Although copper prices have stood during the year at a discouragingly low figure operations were continued at the three important centres that have for many years been the main source of copper in Canada—Anyox, B.C.; Britannia Beach, B.C.; and Sudbury, Ont. Production rose during the past year to 101,565,000 pounds with a value of \$13,204,000.

Ontario and Yukon continue a steady production of lead, but British Columbia is to be credited with the greater part of the lead and zinc produced in Canada. There are several mines, but the bulk of the ore comes from the Sullivan mine at Kimberley, B.C., one of the foremost mines of the world.

CANADA'S SECONDARY CANALS*

Extent and Importance of Our Scheme of Inland Navigation —Historical Interest

Canadians are fully alive to the great commercial asset represented by the St. Lawrence and Great Lakes route, but not so many are aware of the extent and importance of what are known as Canada's secondary canals. Of late years these smaller canals have been overshadowed by the importance of the main route, and the possible reconstruction of the St. Lawrence canals on a scale to compare with the gigantic Welland Ship canal now in course of construction. As a matter of fact, the Ottawa canals, between the St. Lawrence and the city of Ottawa, and the Rideau canal, between Ottawa and Kingston, were nearing completion while the advocates of the St. Lawrence canals were debating whether a system of barge and schooner canals of 4 feet draft, or a steamboat canal of 8 or 9 feet draft would be more suitable for the St. Lawrence system, and there was a time when the advocates of the St. Lawrence canals were afraid that the Rideau route might injuriously affect the St. Lawrence route. Almost a hundred years have passed since the advantages of the rival waterways were so warmly debated and there is no longer any question as to the pre-

eminence of the more direct St. Lawrence system. While these interior canal systems may now be of secondary importance they nevertheless serve a very useful purpose in the Canadian scheme of inland navigation, and, more especially in the modern sections of the Trent waterway, have an important bearing, from the standpoint of the hydro-electric power development, on the industrial life of adjacent communities. The massive stone locks and engineering works of the Rideau system still testify to the painstaking efficiency of the Royal Engineers who superintended the construction of this system, largely as a military measure, one hundred years ago. These secondary canals may be shortly described as follows:—

(a) The route from Montreal to Kingston via the Ottawa and Rideau rivers, through the Carillon, Grenville, and Rideau canals—total length 252 miles. The Carillon canal with a navigable stretch of 27 miles gives a route through the lake of Two Mountains and the Ottawa river, while the Grenville canal, situated about 56 miles below the city of Ottawa, enables the avoidance of the celebrated Long Sault rapids and gives passage to a point in the Ottawa river affording unimpeded navigation. The Rideau system connects the Ottawa river with the eastern end of lake Ontario at Kingston. It is 126½ miles in length with 47 intervening locks.

(b) The navigation of the Richelieu river from its junction with the St. Lawrence to lake Champlain (Chambly canal), Montreal to the International Boundary—127 miles. The minimum depth of water is 6½ feet. At Whitehall, at the southern end of lake Champlain, connection is obtained by means of the Champlain canal with the river Hudson, by which the city of New York is directly reached. The total distance between Sorel at the head of this route to New York City is 441 miles.

(c) The route from lake Ontario to Georgian bay, known as the Trent canal, comprises a series of navigable rivers and lakes connected by short canals, forming a continuous system of navigation for 204 miles from Trenton on lake Ontario to Eashago at the northern end of lake Couchiching. Nearly a century ago the utilization of these waters for the purpose of through water communication between lakes Ontario and Huron was projected by the Imperial Government and the work initiated. The Bobcaygeon section was commenced in 1833 and opened in 1835. The province of Upper Canada continued the work from 1840 to 1867, and later the Ontario Government built two locks between this point and Balsam lake. The latter locks were enlarged by the Dominion Government which has constructed seventeen ordinary locks and two hydraulic lift locks, one at Peterborough and the other at Kirkfield. These hydraulic lift locks are stated to be the largest in the world of that type. The construction of the all-river route from Trenton to Rice lake was commenced in 1907. It is now completed and is the most modern of the various units.

A canal which though small in size is playing a large part in the maritime welfare of the country is St. Peter's canal at Cape Breton, Nova Scotia. This canal, crossing an isthmus half a mile in width, connects St. Peter's bay on the southerly side of Cape Breton, with the Bras d'Or lakes and thus gives access to the Atlantic ocean.

* Prepared from material supplied by the Department of Railways and Canals, Canada.

The rise in the output of lead was one of the outstanding features of the year's mining activities, a total of 168,713,500 pounds being produced with a value of \$13,497,000, as compared with 111,234,466 pounds, valued at \$7,985,522 in 1923. Zinc production rose from 60,416,240 pounds in 1923 to 90,000,000 pounds last year, the 1924 output being valued at \$5,670,000.

There was a heavy falling off in the production of coal in 1924. This was due in part to lack of orders occasioned by slackness in the iron and steel industries and in other manufactures. It was due in part also to the long continued cessation of operations in important coal mines in Alberta. The output of the Canadian coal mines for 1924 was 13,100,000 tons; the output for the year 1923 was 16,990,571 tons.

The asbestos mining industry in Canada suffers from the keen competition of the Rhodesian mines. Last year's production decreased 11,482 tons, the 1924 output being 220,000 tons valued at \$7,200,000. Rhodesia has the advantage of cheap labour and is placing large quantities of the long fibre or crude asbestos on the market.

The high prices paid for white arsenic has directed attention to the possibilities of Canadian sources. The principal source in Canada has been for many years the arsenides and sulpharsenides of cobalt and nickel of the Cobalt silver mining district. During the year mining of the arsenical gold ores of Hedley, British Columbia, was resumed, and shipments of concentrates carrying arsenic and gold were made from Nova Scotia.

It is generally conceded that judicious and well-directed advertising is a big factor in promoting business enterprise. During the summer of 1924 a most energetic campaign in advertising Canada's mineral resources was conducted. Not the least important result of the advertising, was the general strong impression that was made on the English public that Canada is a country of immense resources. Such an impression should be an important factor in directing emigration to this country. Capital follows population and population begets capital.

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OTTAWA, FEBRUARY, 1925

THE NORTHERN PLAINS OF CANADA

(Continued from page 1)

For nearly fifty years after Back's expedition interest in the country flickered nearly to extinction and it remained for two private expeditions, made with the object of sport and travel by men who were good observers but lacked scientific training, to awaken interest and throw new light on the country. These were made respectively by Pike in 1888-89 northward from Great Slave lake, and by Hanbury in 1898-99 in an east and west traverse through the country to the north of Hearne's track. At the time of these expeditions settlement had been greatly extended westward and northward in Canada since the time of the earlier explorations and the "Barren Lands" occupied a position much closer to civilization and more accessible from it. The viewpoint of these men was therefore a more modern one. The country was no longer off the economic map and we find them examining it with an eye to its possible resources. It is interesting therefore to note the impression received by these two men who were absolutely unbiased and had unusual opportunities to study the country.

Pike repeatedly calls attention to the surprising growth of the vegetation and the pleasant, open character of the country. At one point in his narrative he says, "We saw that the country northward presented a much more fertile appearance than anything we had seen on the south side of the watershed. There was a luxurious growth of grass over the sandy ridges and during the two months of summer one could imagine one's self back on the prairies of Alberta."

Hanbury travelled the country more extensively than Pike and he is more emphatic in his statements. He writes, "I have always maintained that the 'Barren Ground' is a misnomer for the northland of Canada. No land can be called 'barren' which bears wild flowers in profusion, numerous heaths, luxuriant grass, in places up to the knee, and a variety of moss and lichens. It is barren only in the sense that it is destitute of trees."

Other recent travellers take much the same view. Mr. A. E. Preble of the United States Biological Survey who spent some years in Mackenzie district and visited the "Barren Lands" refers to the vegetation which he notes proves "the appellation 'Barren Grounds' to be a misnomer" and Mr. Thompson Seton after a summer's journey into the

THE OBJECT OF FOREST RESERVES

Areas Set Aside for Forestry Purposes by Department of the Interior Give Manifold Service

There are some popular misconceptions in the public mind as to the object of the creation of Dominion Forest Reserves. The term "reserve" is perhaps responsible in a large degree for these misconceptions on the part of many who do not have occasion to inform themselves on the motive of the Government in setting aside these areas. A common impression is that these areas consist almost entirely of mature stands of valuable timber which have been withdrawn from disposal and are being held "in reserve" to supply a demand when timber from other sources will have been used up. Those who hold this view usually conceive of a forest reserve as being rigidly closed to the public, and that no business or recreational pursuits of any kind may be carried on within its boundaries. This conception is the exact opposite of the real function of these reserves which is primarily the production of wood for use.

The main objects in setting aside Dominion lands as forest reserves were:

(1) To secure the protection, maintenance, and reproduction under scientific management of the timber growing on the land.

(2) To devote to the growing of timber, lands which are primarily suited to that purpose and which are not suited to agriculture.

country described it as the "Arctic Prairies." Mr. J. B. Tyrrell, D.L.S., made two explorations across the south-eastern portion of the open plains and he adds the weight of his evidence to discredit the implications contained in the name "Barren Lands."

It might be said broadly that up to the time of Tyrrell's exploration the country had been viewed twice. As a result of the first inspection it was economically dismissed as "the Barren Lands," while the second examination challenged the earlier description, revealed the fact that there is a wide variation in the character of the country and claimed that it is not lacking in resources of value.

A re-examination of the country has therefore been begun by the Topographical Survey of Canada. Surveys are extended into the country to permit of the preparation of accurate maps and explorations are extended from them to determine its character.

The country so far examined is not barren. Its vegetation is restricted and it has a severe climate with exaggerated extremes but its hills are well clothed in shrubs, mosses, and lichens, and in its valleys especially proceeding towards the coastal plains there are great stretches of pasture land. Its animal life is abundant though strongly migratory, adapting itself thereby to the conditions of abundant food at one season and a severe climate at another. The country provides amply for the essential requirements of life in its animals and the waters of its lakes and rivers are abundantly stocked with fish. It has also been found that the geological situation is favourable for the occurrence of minerals.

It may be taken therefore from a study of available records and recent investigations that the idea expressed by the name "Barren Lands" is not justified by conditions found in it—the soil is not generally barren nor is the

(3) To conserve the water supply of a watershed and prevent the rapid runoff, thus ensuring the continuity of stream flow.

It will thus be seen that a forest reserve may contain areas of mature timber, areas of young forest growth, and sparsely wooded or even treeless areas.

The mature stands of timber are submitted to a careful examination, and the quantity determined which can be removed without impairing the timber reproduction of the area. As demand for the timber arises the logging rights on the area are disposed of by public tender, and the trees to be removed are marked. In addition to the logging rights disposed of in this way, permits are granted to settlers at a nominal charge to cut for their own use posts, poles, fuel and saw material.

The areas of young growth are studied and the rate of growth hastened by thinning and the removal of undesirable species.

In the sparsely wooded districts, if a sufficient number of seed trees are present, the area gradually reverts to forest by natural reproduction. In districts where an insufficient number of seed trees of desirable species are present, artificial planting is resorted to in order that a satisfactory tree crop may result.

The more lightly wooded districts usually produce an abundant growth of forage plants. Where a demand exists, the residents of lands in the vicinity of the reserves are allowed to pasture stock on these areas. In this way grazing is provided for from 75,000 to 100,000 head of stock each year, and at the same time, the forests are benefited by the removal of the forage growth which when dry constitutes a serious fire menace.

Each year an increasing number of people visit the forest reserves for camping, fishing, picnics, and other

climate too severe for plant growth. It is expedient therefore that this unfavourable impression be corrected by a more truly descriptive name. Recognizing the fact that in such a vast area a variety of conditions exist the name should be such as to give it position and general character but should avoid particular attributes.

As an analogy we have the case of the prairies of Western Canada where conditions of soil, moisture and climate vary considerably. An intelligent idea of them is conveyed by the description "the western plains" or the "plains of Western Canada." They are given position by the word "western" and are united under their common character of "plains" and no commitment is made of either a favourable or unfavourable nature.

There is no reason why the same idea may not be carried out in the case of the northern treeless country. It also may be given position by the term "northern" and character by the description "plains" for the general surface topography of the two areas does not differ greatly. Accepting this designation for the plains of the north, Western Canada east of the Rockies may be divided into three great divisions, the Western Plains, the Forest Lands of West Canada, and the Northern Plains.

HOLDING POWER OF NAILS

The Forest Products Laboratories of the Department of the Interior of Canada have been investigating the problem of the holding power of nails. This feature of nail driving is of high commercial value. Practically all wood construction is dependent upon nails and there are many kinds of wood being used for building and other woodwork, with the list constantly increasing. Nails too, vary greatly as regards kind and size. The cut-nail has greater holding power than the wire nail, but is not so easily driven, while the wire nail has its holding power considerably increased when cement coated and barbed. A difference of one-half inch in length of a nail will mean an appreciable saving where large quantities of nails are used, as for instance in a packing case industry. Some 600 nail tests have already been made by the departmental laboratories and this work will be continued until all Canadian commercial woods have been carefully covered.

recreational purposes. Summer resort lots and camping grounds have been laid out on suitable lakes in several of the reserves, and these are patronized each summer by people from the cities who avail themselves of the opportunities thus afforded to enjoy the great outdoors. Many have leased lots in these resorts, and built cottages on them to which they return each summer. The popularity of the reserves as recreational resorts increases each year as they are rendered more accessible by the building of roads suitable to automobile traffic.

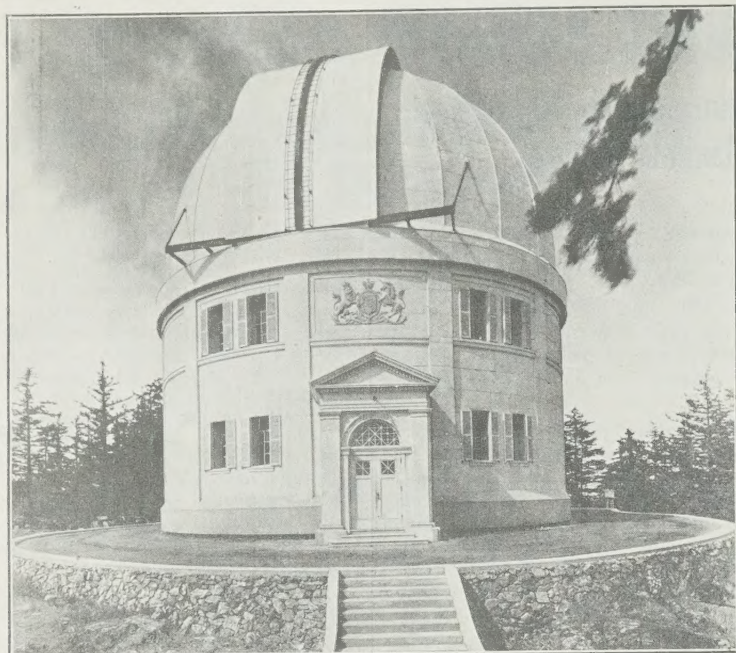
It will be seen, therefore, that the principal reason for the creation of forest reserves is to enable the principles of forestry to be carried out on these areas without interruption over a long period of years. In other words, these areas may be looked upon as large tree farms which are to be managed in such a way that they may be made to produce an undiminishing supply of timber, the output each year being governed by the annual increment in growth. At the same time every effort is made to encourage the fullest possible use of the resources of these reserves consistent with the maintenance of their productivity.

Ontario was the largest shipper of meats of the provinces of the Dominion in 1923, shipping in all 210,337,913 pounds. Of this amount 90,791,873 pounds were exported to Great Britain and 21,778,554 pounds to other countries. Manitoba was next in the shipping of meats with 45,591,190 pounds and Quebec third with 29,812,419 pounds.

The silver black fox industry, though carried on in every province in Canada, is more intensively developed in the Maritime Provinces. During the past fiscal year approximately 4,000 live foxes were shipped out of the province of Prince Edward Island. Of these 3,000 were exported, many going to the United States where the industry is developing at a rapid rate.

The whaling industry in British Columbia produces annually about 400 tons of whale bone meal and 900 tons of meat and blood for fertilizing purposes. A small quantity of this is sold as fertilizer in the province and the remainder is exported, principally to the United States.

Of the total area of Canada, 950,000 square miles (approximately one-quarter of the whole) is forest land. Less than half of this carries timber of merchantable size (6 inches in diameter) at the present time, and only about one-quarter carries saw material (10 inches in diameter).



The Dominion Astrophysical Observatory—Front view of the building which houses the great 72-inch reflecting telescope on Observatory Hill, Victoria, B.C.

THE DOMINION ASTROPHYSICAL OBSERVATORY

—
LINES OF INVESTIGATION
BEING FOLLOWED
—

Victoria, B.C., Institution Has Built Up Solid
Reputation in Field of Astronomy

The Astrophysical Observatory at Victoria, British Columbia, is a branch of that department of the Federal Government charged with the administration of the western lands of the Dominion, the Department of the Interior. In the colonization of these lands, one of the obvious first needs was a survey of the boundaries and subdivision into townships and sections. This need led to the organization of the surveys branch of the department and out of the necessity of accurate astronomical observations to delimit the boundaries and define the position of the base lines for subdivision work arose the astronomical branch.

To carry on this work the Dominion Observatory at Ottawa was established in 1905, the work of which observatory has been recently dealt with. This observatory is equipped with a 15-inch refracting telescope with which important work is done. The need of a larger telescope for the purpose of extending the research work was felt so keenly that the construction of an astrophysical observatory, having a 72-inch reflecting telescope, was begun in 1913 and completed in 1916. It was originally intended to locate this telescope at Ottawa but upon further consideration it was deemed advisable to place it at a point in Canada where the best observing conditions prevail. After a series of tests this point was found to be in the vicinity of Victoria, B.C.

It is a matter for national pride that in design and construction and operating convenience and accuracy it is not excelled by any instrument and that it is the largest and most effective telescope in any national observatory, being exceeded in size only by the 100-inch reflector at the Mount Wilson observatory, of the Carnegie Institution. But since no matter how large or efficient the telescope, the value of the work of

the observatory depends on the efficiency and wisdom with which it is employed, it is proposed here to give a brief summary of the work undertaken and the results obtained during the six years the Astrophysical Observatory has been in operation.

The ultimate purpose of all modern astronomical work is to solve, so far as may be possible, the riddle of the universe, to determine its dimensions and arrangement, and to inquire into the processes and laws which govern its constitution and evolution. In order to make any advance in this problem, certainly the most important and all-embracing problem of science, it is necessary to obtain observational data about as many of the individual members of the universe, the stars and nebulae, as possible. The enormous numbers make this task an onerous one, quite hopeless of accomplishment at university or private observatories. Consequently it has always been considered the proper function of national observatories, with their greater continuity of direction, to undertake the large and often routine investigations of the positions, motions, distances, etc., of the stars as their contribution to the problem of the universe. Hitherto the activities of national observatories have been chiefly confined to obtaining accurate positions of the stars, partly on account of the application to navigation and surveying and in this work the observatory at Ottawa is taking an effective part.

It was deemed wiser and more useful at Victoria to strike out a new line of work and consequently the problems undertaken have been the determinations of the motions, the distances, and the constitution and evolution of the stars. The study of the motions of the stars was the first large piece of work undertaken and in three and a half years the Victoria Observatory measured the speed towards or from the earth, technically called the radial velocity, of 600 stars as compared with about 2,000 determined previously at all other observatories. An investigation of the distances of 1,100 stars just completed at the Astrophysical Observatory compares equally favourably with about 2,500 stars, the distances of which have been hitherto determined elsewhere. The problem of the constitution and evolution of the stars scarcely admits of numerical comparison but the work along this line has elicited considerable discussion and favourable comment in the scientific world.

HYDRO DEVELOPMENT IN CANADA

British Columbia Is Generously Supplied with Water-Power Resources—Present Installation

With practically two million twenty-four-hour horse-power available under conditions of ordinary minimum flow and five million during at least half the year British Columbia is generously supplied with water-power resources. The present turbine installation in this province amounts to 355,000 horse-power and this total will be largely increased by the developments now approaching completion in the Stave Lake watershed, on the Kootenay and Powell rivers.

The Powell River Company has raised the height of its dam on the Powell river fourteen feet, increasing its storage capacity by 630 square-mile feet, and proposes to increase the capacity of its power plant by 20,000 horse-power. The East Kootenay Power Company has just completed a 15,000 horse-power development on the Elk river, while the West Kootenay Power 'Light' Company has demolished its 4,000 horse-power plant at Lower Bonnington Falls on the Kootenay river and has commenced a development of 60,000 horse-power capacity, of which the initial development is to be 40,000 horse-power.

The works now in progress on the Stave river and on Alouette lake are of considerable magnitude and are designed to provide for the growing requirements of Vancouver and district, which has already a considerable amount of water-power development to its credit, the supply of electricity being maintained by the British Columbia Electric Railway Company and its subsidiaries which, towards the end of the last century, began to supply power from a steam-power station and which is responsible for the present works.

The water-power supply of Vancouver is provided from three stations, Coquitlam-Buntzen No. 1 of 43,500 horse-power, Coquitlam-Buntzen No. 2 of 40,500 and the Stave River station of 52,000 horse-power, that is to say, until recently the total water-power development supplying Vancouver and district amounted to 136,000 horse-power. The work now in progress will increase this supply by 45,500 horse-power, and it is to be obtained by erecting a station on Stave lake, using water drawn from Alouette lake, and by raising the head, adjusting the existing units, and adding a new unit to the power station on Stave river.

Briefly outlined, the work now in progress involves raising the existing dams and rebuilding the four existing units on Stave river to produce 70,000 horse-power as against their present capacity of 52,000 horse-power, adding a fifth unit of 15,000 horse-power to utilize the additional water diverted from Alouette lake and the construction of an entirely new development in connection with Alouette lake of 12,500 horse-power.

These increases involve a considerable amount of heavy construction work. On Stave river the intake dam has been raised twenty feet and a new penstock installed and, in order to give stability to the higher structure, four

Notwithstanding its short period of activity there is already being built up a solid reputation both for the Observatory and its staff which is evidenced among other ways by the award to the Director of a Fellowship in the Royal Society of London.

radial tainter gates have been removed so that the large wells required for their operation could be filled in with concrete and all five penstocks openings are now provided with roller gates. The main dam has been raised twenty-five feet and lengthened sixty-six feet, the stop-log sluices filled in, a sixteen-foot concrete roadway constructed on the deck of the dam, and the powerhouse has been enlarged to receive the new unit. About a quarter of a mile to the east of the main dam there is another channel which was originally blocked by a small stone-filled timber crib dam having ten fourteen-foot sluices. This has been replaced by a concrete structure 640 feet long containing ten twenty-eight-foot sluices and four tainter gate openings.

The work in connection with the Alouette development involves the construction of a hydraulic fill dam on Alouette river a short distance below the lake to raise the level of the lake a maximum of forty-five feet. The water thus stored will be conducted through a fourteen-foot square tunnel 3,600 feet long to a powerhouse to be erected on the shore of Stave lake.

These new developments providing as they do for extensive storage of water, not only represent a most desirable conservation of the water-power resources of this watershed, but also greatly enhance the possibilities of the undeveloped power-site on the Stave river at Ruskin where, when the market warrants its development, another 96,000 horse-power is available.

The Department of the Interior has been particularly concerned with the Stave and Alouette developments in that the lands required for construction and flooding purposes are within the Railway Belt and are, therefore, Dominion lands. In dealing with these lands the department has required that plans be submitted for its approval and this approval has only been accorded when the department has assured itself that its own interests and those of its other concessionaires are adequately protected.

EEL FISHING IN CANADA

Eels in growing quantities are being taken from the coastal and inland waters of the Dominion each year. During the 1923 season 1,114 cwt. were caught by sea-fishermen and 13,753 cwt. were taken in inland waters, as compared with catches of 1,434 cwt. and 11,710 cwt. respectively during the previous year.

Eels are common to most Canadian rivers discharging into the sea, and the species found in the waters of the Dominion is of a high quality and in general favour among epicures. The industry in Canada, at the present time, is not very extensive though holding great possibilities of expansion with the development of new markets.

A peak of interest on the British Columbia-Alaskan boundary is Mount Bagot with an elevation of 7,155 feet. It is in latitude 59°, long. 135° and is named, according to the eighteenth report of the Geographic Board of Canada, after Sir Charles Bagot, British Ambassador to Russia and plenipotentiary to Petrograd in 1882, in connection with negotiations in regard to the Alaskan boundary.

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RAILWAYS START MOVEMENT TO PROTECT FORESTS

MANAGEMENT OF CANADIAN NATIONAL HOLDS MEETING

Discuss Forest Fires as Related to Railway
Operations—Federal and Provincial
Officers Attend

The change of attitude on the part of the railway companies in Canada towards forest protection was fully exemplified at a conference which took place in Toronto recently. Entirely on the initiative of the management of the Canadian National Railway Company a meeting was held in that city for the purpose of discussing intimately the various problems in forest fire protection as related to railway operations. In attendance at the meeting were the general manager of the Central Region, the general superintendent, Mr. William Kilby, Chief of Fire Protection, and many other railway officials, all of whom are keenly interested in the work. Also there were present numerous officers from the provincial and federal forestry services, and other men, notable among whom was Dr. C. D. Howe, Dean of the Forestry School at Toronto University.

Ten years ago such a meeting would hardly have been thought of. At that time the railways were one of the principal sources of forest fires. As a result of excellent regulations promulgated by the Board of Railway Commissioners in 1912, and with the consistent efforts made by the various companies to comply with such regulations, an entire change has been wrought. Although railways operating through forested regions still cause fires, the number of such fires has been very greatly reduced; also those fires which do occur are brought rapidly under control. The net result is that instead of being a primary agent in the source of fire troubles, the railways now occupy the position well down the list.

In former years there was perhaps a tendency on the part of the railways to evade, so far as possible, the responsibility for forest fires. It has become increasingly evident, however, that a railway company which fully shoulders its responsibilities for fire protection work can show very favourable results in reducing the amount of damage claims made against it. Moreover it has come to be appreciated that the forest is a most important factor in supplying the railways with commodities for freight hauls, and the railways now recognize that it is of paramount importance that the forested regions through which they operate must, at all costs, be kept in a productive state in order that the freight revenues may be maintained.

The management of the National

(Continued on page 4)

A WEEK-END WITH THE ESKIMO

Interesting Side-Lights on Social Conditions Among Aborigines of Far Northern Canada

All through the Mackenzie valley, eastward and northward to the Hudson bay, and in the great Arctic archipelago live Indians and Eskimo who as wards of the Dominion are the particular care of the Government. By game and other laws their means of subsistence have been protected and an ever watchful eye is kept on their welfare. In carrying out this work the Department of the Interior sends its

for this article as between Friday evening and Tuesday the greater part of a week's routine will have been exemplified. As the Baffin's Land Eskimo is a strict observer of the Sabbath, Saturday will be a day of more than usual activity, as hunting and unnecessary work around the topek will be taboo on the following day. On Monday it is more than possible that rations will have run short and the community



A Week-End With the Eskimo—After a seal hunt on Baffin island, loading the prize on the "kometik" or sled preparatory to returning to the topek.

officers on periodical trips north even to the farthest confines of the Arctic regions where when occasion demands they spend many months in investigations and explorations, not without considerable danger to their lives. Major L. T. Burwash, exploratory engineer of the North West Territories and Yukon Branch of this department, recently returned from a fifteen-months stay among the Eskimo of Baffin island and the following article on "A Week-End Visit With the Baffin's Land Eskimo" gives a very interesting insight into social conditions among the aborigines of the far North.

The Baffin's Land Eskimo is a most hospitable person and appears to find a real pleasure in entertaining his fellow men. When his guest is a "Kadloona" (white man) he at once assumes an outstanding social position in his local community, and at times finds it hard to conceal his pride in what he considers his elevation above his neighbours. This pride will not be unmingled with very apparent concern as he feels the burden of the responsibility he has undertaken, and together with his wife will be constantly on the alert lest anything mar the "Kadloona's" visit. Should, however, the visit continue for several days, everyone will get more at their ease and the visitor sees a natural and unaffected Eskimo home.

A week-end visit has been selected

committee on ways and means correspondingly busy. We have arrived at the Eskimo home on a Friday evening where a welcome is extended not only by our host but by everyone in the settlement, a silent proceeding on the part of the women, younger men, and children, but by the older men accompanied by the well-meaning wish "a-so-you-tiddle" (may you be strong). These formalities will take place in the open at whatever spot your dog-team comes to anchor. From this point you will head a procession to the topek of your host, where you and the occupants of the topek will be seated on the raised portion of the floor, the others or as many as can be crowded in squatting around the other half of the room. You will find yourself in a sealskin structure which has been overlaid with several inches of heather and then with blocks of snow, the whole forming a warm and most comfortable abode. The heat and light are both derived from two or three seal oil lamps each with a flame very like an ordinary coal-oil lamp but extending along a wick from 12 to 24 inches long. The first thing that will come home to you strongly is the "oodja" or odor of the seal. No one really enjoys this at first but it quickly loses its disagreeableness and becomes at least a matter of indifference, although the Eskimo themselves are rather partial to it.

After everyone who can possibly work

(Continued on page 3)

NOVA SCOTIA IS A PROVINCE OF RARE ATTRACTIVENESS

HOLDS LURE FOR TOURISTS AND SETTLERS

Recent Survey of Canada's "Atlantic" Province Reveals its Quaint Charm—
Rich in Resources

Nova Scotia is Canada's "Atlantic" province. It lies at the southeasterly extremity of the Dominion, projecting out into the ocean and guarding the approach to the gulf of St. Lawrence. Nova Scotia, New Brunswick, and Prince Edward Island constitute what are popularly known as the Maritime Provinces. These roughly conform to the Acadia of earlier times and are therefore rich in colonial history. Almost cut off geographically from the rest of Canada, they represent to-day a distinctive social and economic unit of the Dominion.

The province of Nova Scotia consists of the peninsula of Nova Scotia proper and the island of Cape Breton. The peninsula is about 275 miles in length and varies from 60 to 100 miles in breadth. It is connected with New Brunswick by a low isthmus about 12 miles wide, commonly referred to as "the neck of the bottle." Were this isthmus but a little lower, the waters of the bay of Fundy on the one hand, and of Northumberland strait and the gulf of St. Lawrence on the other, would mingle together.

The island of Cape Breton lies to the northeast of the mainland and is separated from it by the strait of Canso. Its greatest length is about 100 miles and its breadth 85 miles, but it is hollowed out by a remarkable arm of the sea known as the Bras d'Or. The total area of the whole province is 21,428 square miles,—about two-thirds the size of Scotland.

The natural resources of the province are rich and varied. In spite of the extensive outcrops of rock the arable lands are estimated at five million acres. Of these not over one million are yet under cultivation. Forests originally covered almost the entire land surface and are still one of the major resources. The province is also rich in minerals, both metallic and non-metallic. Of the former, gold has been found throughout a wide area, while coal and gypsum predominate in the non-metallic class.

The commercial fisheries rank with the most extensive and valuable found in any part of the world. Though the "banks" have been fished assiduously since pre-settlement days when Basque fleets visited these shores and returned to the old land heavily laden with salted cod, yet the annual catch of Nova Scotia fishermen is valued at ten million dollars. The primary development of these resources has brought forth Nova Scotia's "Big Four" industries, namely,

(Continued on page 2)

FUR FARMING INDUSTRY IN CANADA EXPANDING

General Increase in Number of Farms and Animals is Reported—Its Development

A general expansion in the fur farming industry in Canada is reported by the Dominion Bureau of Statistics. The number of fur farms operated in 1923 was 1,240, an increase of 214 over the previous year. The total value of these farms was \$8,424,934, the stock of 40,125 animals being valued at \$6,325,668, an increase in the value of the farms of \$634,830; in the number of animals of 9,343 and in the value of stock of \$461,515. The revenue derived from the sale of live animals and pelts during 1923 totalled \$2,175,151, an increase of \$637,626.

Fox farming forms the most important branch of this industry. Of the 1,240 fur farms in operation 1,179 were devoted to raising foxes. The revenue derived from the sale of live animals and pelts during the calendar year 1923 was \$2,159,898, 6,433 animals and 8,983 pelts were disposed of. This was an increase of \$633,076 in value over 1922 when 4,113 live animals and 5,661 pelts were sold. The exports of live animals during the fiscal year 1923-24 totalled 3,329 with a value of \$717,213. The shipment of pelts out of the Dominion in the same period amounted to 144,471 valued at \$4,025,338, an increase in the number of pelts of 74,882 and in the value of \$2,139,722. The 1922-23 figures were 1,513 live foxes valued at \$385,152 and 69,649 pelts at \$1,885,616.

The earliest authentic record of the raising of foxes in captivity in Canada comes from Prince Edward Island, where about forty-five years ago a number of foxes were raised on a farm near Tignish. The beauty of the fur of the silver fox and the consequent high prices realized from the sale of the pelts, caused attention to be directed chiefly to this breed—a colour phase of the common red fox which has been established through experiments in breeding carried on by the pioneer fox farmers. After 1890 there came a period of rising prices for furs, and the fox farming industry grew rapidly in Prince Edward Island. In 1913 an enumeration by the Provincial Commissioner of Agriculture showed 277 fox farms in that province with a total of 3,130 foxes. While experiments were being carried on in Prince Edward Island, attempts at raising foxes in captivity were also being made in other provinces, the records showing that foxes were successfully bred in Quebec in 1898, in Ontario in 1905, and in Nova Scotia in 1906. Fox farming is now carried on in all provinces of the Dominion and the number of farms is steadily increasing. The latest statistics (1923) showed Canada with a total of 27,383 foxes, of which 25,186 were silver foxes.

Although the fox has proved the most suited to domestication, other kinds of fur-bearing animals are being raised in captivity—mink, racoon, skunk, marten, fisher, beaver, and muskrat. Karakul sheep, from which are obtained the furs known as "Persian Lamb" "astrachan" and "broadtail," are being raised successfully in Canada as are also chinchilla rabbits. In 1923 the number of farms engaged in the raising of fur-bearing animals other than foxes, was 61, compared with 49 in the previous year. Raccoon farms are the most numerous of the miscellaneous class, mink farms coming next. A few of the fox farms also raise miscellaneous fur-bearing animals in addition to the foxes.



Canada's "Atlantic" Province—The above photograph, taken from a prominence locally known as "The Lookoff" gives a splendid view of the fertile Cornwallis valley, Nova Scotia. This and the Annapolis valley form the centre of the fruit-growing industry in this province.

NOVA SCOTIA IS A PROVINCE OF RARE ATTRACTIVENESS

(Continued from page 1)

Farming, Fishing, Lumbering and Mining.

Farming has attained its highest form of development in the famous Annapolis-Cornwallis valley where fruit growing has made wonderful strides in recent years. The apple crop alone now amounts to nearly two million barrels annually. Dairying is also expanding rapidly in all agricultural sections while sheep raising promises to become equally popular.

The greatest activity in the fishing industry centres at Lunenburg, on the south coast, which is the home port of the majority of the bank schooners. Other important centres are Digby, Canso and North Sydney.

Lumbering, including the cutting of pulpwood, is widely prosecuted, while most of the mining industry centres about the coal-fields of Cape Breton island and Pictou and Cumberland counties.

The pursuit of these industries has favoured the settlement of areas contiguous to the shore. Owing to its rough nature and scanty resources, much of the interior is still a wilderness. The irregular shape of the province, with its many deep inlets and bays, is such that no part of the land, especially where populated, is far removed from salt water. The influence of the sea, therefore, has played an important part in the lives of the people and reflects strongly in all their activities.

Considered only from the aspect of its physical attractions Nova Scotia ranks with the most famous countries of the world. What it lacks in grandeur of massive mountain or lure of lonely desert is more than compensated for by a charming diversity of unrivalled features of lesser magnitude but greater beauty. To this must be added an ease of accessibility, ideal sojourning conditions, and a charm of welcome and warm hospitality. As a summer playground area by the sea for the masses who live in the New England States and interior Canada, this province stands out pre-eminently.

The dyked lands of Nova Scotia are a distinctive feature. The art of reclaiming these low fertile lands was introduced by Acadian pioneers who were brought over from France in early days. Excellent examples of well engineered dykes, each with its ingenious abateau, are to be seen in many sections of the province. The most extensive works are found in the old Grande Pré district and about the head of Chignecto bay, where lie the Elysian fields and the world renowned Tantramar marshes. The latter are mainly in New Brunswick and extend across the isthmus. Dotted with hundreds of hay barns they present a unique sight. The odd-looking little stacks of salt hay, cut on undyked

marshes and built up on platforms supported by posts or piles, give a further touch of the unusual.

It would be impossible to enumerate the many major points of interest in the province. For those who prefer the wonders of the sea shore, attention might be called to Halifax harbour and its matchless inner haven, Bedford basin, where it is said "the navies of the world could ride at anchor." St. Margaret's bay, Mahone bay and Chester basin, with labyrinths of green island and countless coves and sandy beaches, rank with the prettiest watering places of the world. The high tides of the bay of Fundy are internationally renowned. Lunenburg port is always animated with schooners. Yarmouth, Digby, Parrsboro, Canso, Pictou and Sydney cannot fail to delight the marine enthusiast at any time. So will scores of other ports, for the harbours of the province are legion.

Inland waterways and rural landscapes of more than ordinary merit are also beyond the scope of the enumerator. One can recall at random such famous attractions as the charming Wentworth valley; picturesque Five Islands; the College Farm at Truro; the rolling hills and winding streams of Pictou and Antigonish and Guysboro counties; the murmuring waters of St. Mary's river; the bore of the Shubenacadie; the peerless Dartmouth lakes, the intricate Tusket river system; or the maze of numberless forest-girt lakes radiating from the remote village of Caledonia. Perhaps as a climax might be mentioned the matchless Bras d'Or lakes, those unique inlets of the sea, and the Scotland-like hills and valleys of north Cape Breton. If native scenery was Nova Scotia's sole resource, she would still be a country of limitless possibilities.

To the unparalleled picturesqueness of this province must be added an equally wonderful endowment of all those correlated advantages which go to complete the happiness, comfort and entertainment of the tourist or holiday visitor. These include unexcelled facilities for motoring, boating, fishing, hunting, camping, and, in short, all recreative, holiday and out-door activities. The sightseer, the sportsman, the artist, or the seekers of rest and quiet, all find their Mecca here, where there awaits the maximum fulfilment of their desires.

It must not be inferred that Nova Scotia does not appeal to the would-be permanent settler as well as to the transient summer visitor. Its agricultural and industrial possibilities, particularly, are very promising. Under present day conditions, there is probably no so-called "new" district to be found wherein conditions are more favourable for the average home-seeker. Land values are still comparatively low. The amenities of civilization have been brought within easy reach of every

MINING DEVELOPMENTS IN YUKON TERRITORY

New Discoveries of High-Grade Silver-Lead Ore Made in Mayo District

The past year has been one of many new developments in silver-lead mining in the Mayo district, Yukon territory. The chief development was the discovery of high-grade ores on Galena hill, which lies across the valley of Christal creek from Keno hill. The discoveries lie between those of Keno hill and the Silver King mine on Galena creek, the latter being the original producer of high-grade ore in the Mayo district. The ores are similar in character to those of Keno hill.

On Keno hill, Treadwell Yukon Company, Limited completed their drainage tunnel, which was to tap the vein at a depth of 500 feet. This tunnel has been connected up to No. 2 shaft. Lateral development along the vein is now proceeding. The Treadwell Company also landed at Mayo before the close of navigation on Stewart river, the machinery for a mill of 100 tons a day capacity. Sufficient concentrating ore is in sight for this mill for several years.

The Onck Mining Company, now reorganized as the Reserve Mining Company, did a small amount of prospecting on its claims, the Fisher and Lone Star claims. Several individuals were prospecting their claims on Keno hill during the summer and a small production from this source is looked for next spring. It is also interesting to note that some work is being done on the Lookout group in Lookout mountain.

Some prospecting has been done in the Beaver River district, which lies some fifty miles to the north of Keno Hill area. Ore deposits have been found at a number of points here, chiefly McKay hill, Silver hill, and Grey Copper hill. These discoveries, however, have proved to be low-grade ore, which cannot be worked under present conditions.

The social and educational advantages of this cultured old province are distinctive features, and a newcomer would find himself ushered into the midst of congenial surroundings, instead of having to face the extremities of a long period of pioneering incidental to settlement in a "new" country. Especially to those who are about to leave the British Isles in search of new homes, Nova Scotia cannot fail to appeal because of a striking similarity of physical features and a closely related population.

COLLECTION OF FISH EGGS

Hatching Now Under Way For Next Season's Distribution of Fry in Canada

The Department of Marine and Fisheries collected over 741,000,000 fish eggs during the fall season of 1924. These eggs are now undergoing incubation in the various hatcheries from coast to coast and the resultant fry will next spring and summer be distributed in suitable waters throughout Canada. The collection according to species is as follows:—

Atlantic salmon.. . . .	33,198,900
Speckled trout.. . . .	3,789,000
Brown trout.. . . .	79,800
Landlocked salmon.. . . .	1,500
Salmon trout.. . . .	29,754,000
Whitefish.. . . .	543,980,000
Cisco.. . . .	26,920,000
Sockeye salmon.. . . .	100,513,000
Spring salmon.. . . .	2,327,500
Steelhead salmon.. . . .	46,700
Coho salmon.. . . .	207,800
Chum salmon.. . . .	228,000
Kennerly's salmon.. . . .	40,000

Total 741,086,200

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OTTAWA, MARCH, 1925

A WEEK-END WITH THE ESKIMO

(Continued from page 1)

a way in through the 2- by 3-foot door has been made as comfortable as circumstances will permit, there comes your one big opportunity to make or mar your reputation within the settlement. If your advent has been expected plenty of hot water will be available. If not you must at once suggest that plenty be heated without delay, as it is your wish to have everyone join you in drinking a cup of tea and enjoying "seva" (ship's biscuit). If molasses with which to sweeten and incidentally flavour the tea is available, it will be even more acceptable. This will conclude the ceremony of your introduction and before very long the local guests will drop out one by one and the family in residence will readjust the many caribou skins that comprise their bedding, leaving a choice location for your sleeping bag.

Before retiring the host will outline the proposed activities of the various groups of hunters for the following day and ascertain which you would rather join. The lamps are filled and trimmed and everyone retires in a brightly lighted topek, as the Eskimo is nervous about sleeping in the dark. On this Saturday you will follow the seal hunters. Breakfast being over the dogs are harnessed to light kometiks and a hurried start is made down over the ice foot and through the ground ice which will, if the tide is low, give you all the thrills obtainable from a joint performance of tobogganing and ski-jumping. When the "seko" or floating ice is reached the teams are headed out to sea for a race of from ten to twenty miles to the "sena" or open water. The first kometik to reach the sealing ground will get by far the best hunting as the seals move away as the shooting starts, so everyone is anxious to be among the first to get into action.

On reaching the open water the edge of the ice is lined with hunters stationed from one hundred to two hundred yards apart, and for an hour or more, there will be a more or less rapid fire kept up as the seals show their heads above the surface of a sea that owing to the low temperature of the air, looks much like a boiling caldron. One or more kayaks will have to be brought on the kometiks and with these the dead seal are brought to the floe edge and then hauled onto the ice. By this time it is long past noon and all hands quite ready to partake of a little food. Someone throws a seal on its back, splits it from throat to tail, strips off the skin and blubber together, and then all gather around with their knives, and selecting whatever cut appeals to them, proceed to gather strength for the trip home. The dogs are next fed, one seal being divided amongst 12 or 14 dogs.

DAIRY EXPORTS SHOW BIG INCREASE IN 1924

Demand for Canadian Butter Nearly Doubled
That of Previous Year

Exports of dairy produce from Canada during the past calendar year continued to increase according to figures issued by the Department of Agriculture and the aggregate value rose from \$28,345,099 in 1923 to \$41,551,730 in 1924. The revival in the export trade in butter and a continued improvement in the quantity of fresh cream, milk, and milk powder shipped were the chief factors in the increase in the year's figures. The quantity of cheese exported rose over 5,000,000 pounds but notwithstanding this there was a slight decrease in the total value. Milk powder exports increased considerably and condensed milk showed a drop of over 800,000 pounds but without any noticeable change in the total value from 1923.

The following comparative table gives the quantity and value of exports of dairy products during the years 1923 and 1924:—

	1924	1923
Cream, fresh, gals.	3,288,822	2,668,747
Value	\$ 5,328,446	\$ 4,451,582
Milk, fresh, gals.	2,896,279	2,132,765
Value	\$ 523,327	\$ 437,215
Butter, lb.	22,343,939	13,173,711
Value	\$ 8,000,512	\$ 4,905,608
Cheese, lb.	121,465,600	116,201,900
Value	\$22,375,787	\$23,445,401
Milk powder, lb.	7,264,947	4,975,838
Value	\$ 690,451	\$ 475,419
Milk, condensed, lb.	40,250,600	41,092,200
Value	\$ 4,628,913	\$ 4,628,979
Casein, lb.	57,059	8,910
Value	\$ 4,294	\$ 895
Total value	\$41,551,730	\$38,345,099

Returning to the topek hot water for tea and "oo you" or stewed meat, will be waiting, and the real meal of the day will be quickly despatched, after which the successes and failures of the day's hunt will be gone over much as our local huntsmen do around the evening camp fire.

On Sunday morning everyone will be lazy, but when once the topek comes to life the day will be spent in alternately eating and singing hymns. As many of the natives covet the position of local preacher, the services of song will move from topek to topek, the head of the household assuming the leading role in his own home, but if the white man has plenty of tea, biscuits, and molasses when the need of refreshment is felt, a general move will centre on the topek of his host.

On Monday morning with a caribou hunt in view everyone will be moving early, as the caribou will call for quite as long if not a longer day than the seals. Breakfast over, the party using light kometiks, commence the invariable ten-or twenty-mile race to the hunting grounds. Should the caribou be close to the sea ice their proximity is quickly announced by the dogs, but should no deer be close enough to excite the dogs, the hunters will select a commanding spot and using their telescopes, "spy" until either the caribou or their fresh tracks are located, when they will make almost as uncontrolled a scramble as would the dogs had they scented them. The hunt will soon be over, as no scheme of cutting off the retreat of the game is ever considered, the attack developing entirely on one side, thus leaving the caribou an easy channel of escape. In spite of this, quite enough if not too many will have been killed. No official meal is taken to-day but each hunter eats what meat appeals to him as he works. Should the caribou be fat they will eat to repletion, as the native cannot resist just one more piece of caribou suet. Here it may be mentioned that the Baffin's Land Eskimo eat little blubber or seal fat, their palates favouring that of the caribou. The leg bones are carefully saved and



The Canadian Metre Rule—The one-metre comparator of the Physical Testing Laboratory, Topographical Survey of Canada. This apparatus is employed for the intercomparisons and study of the laboratory one-metre rules which form the bases for lengths measured by the survey.

CANADIAN METRE RULE VERIFIED IN FRANCE

Topographical Survey's Standard of Length
is Compared with International Bar

The proper development of the natural resources of a country depends in no small measure on the accuracy of its surveys. To attain as near as possible to absolutely accurate surveys is the aim of the different organizations entrusted with this work in Canada and with this end in view a verification of the standard metre rule of the Topographical Survey of Canada, Department of the Interior, was made recently in France, by comparison with the International metric rule. The Canadian standard, which is kept in the Physical Testing Laboratory of the Department of the Interior at Ottawa, is employed in the verification of measures used by the field staff of the Topographical Survey. It is made of nickel and was standardized by the International Bureau of Weights and Measures, Sevres, France.

One of the advantages of the metric system is that all lengths, no matter in what country, the measurements are made, are referred to the same ultimate unit, the International metre. The metre is the length between two fine lines engraved on a rule composed of platinum-iridium alloy, which is carefully preserved at the International Bureau of Weights and Measures.

At the bureau there is a permanent staff of scientists who conduct the standardization of measures in terms of the international units. The bureau workers also carry out much valuable research on matters affecting units of measurement and the verification of measures, which, with the ever more exacting demands of science and industry, has to be carried out with continually refined precision.

When the present International metre was constructed a number of platinum-iridium copies were also made, as nearly similar as possible to the metre itself. These were all carefully compared together and verified, and, save for one or two kept as working standards by the bureau, were distributed to the countries supporting the International Convention at that time (1890).

After when the topek has been reached, are cracked, and the marrow eaten such as the Ontario farmer boys enjoy butternuts on a winter evening.

On Tuesday morning the white man's dogs are harnessed and after a handshake, accompanied by the Eskimo word of farewell, "tabouote" he pulls out across the sea ice for his next objective.

These prototype copies are the means by which the working standards of the countries concerned are linked up with the International metre. They are treated with great care, and when possible, compared periodically with one another and with the International metre. One of the United States copies, for instance, was taken to Sevres for re-verification in 1903 and again in 1923. Canada, which did not subscribe to the International Convention in 1890, has no platinum-iridium prototype metre.

Advantage was taken of the visit to Europe of one of the Physical Testing Laboratory staff to have the laboratory standard rule re-verified against the international standards. Whilst in Europe the Physical Testing Laboratory rule was also taken to London and compared with a copy of the Imperial yard. In both the metre and the yard only one intermediate rule separates the unit of the Physical Testing Laboratory from the actual primary standard. A closer relation is impracticable as the yard, like the metre, is carefully preserved and only disturbed for periodical comparisons with its copies, which are used in the standardization of other rules.

The legal Canadian yard has not been compared with the Imperial yard, of which it is nominally a copy, since 1874. Arrangements are now being made to use the one-metre comparator of the Physical Testing Laboratory, by which standard rules are compared with one another, for a study of the Canadian yard and the determination of the relation between the present legal yard, the Imperial yard, and the metre.

THE KEEPING QUALITIES OF APPLES

The most important end of apple growing to-day is quality production and it is the first consideration if the industry is to prosper. The three years' investigations carried on by the Department of Agriculture to ascertain the probable reasons for apples spoiling in transit or shipment has revealed, among other things, that apples produced on young trees were poorer shippers and keepers than those produced on older trees; that apples produced on clay loam have better keeping qualities than those grown on either heavy clay or sand. Rough handling is, however, the cause of greatest loss and amounts to from ten to fifteen per cent of the crop marketed by the average grower.

The total yield of wheat in Canada for the year 1924 is now finally estimated at 262,097,000 bushels from 22,055,710 acres, as compared with 474,199,000 bushels from 22,671,861 acres in 1923.

CONCLUSIONS REACHED FROM RECENT ECLIPSE

**Dominion Observatory Party Devoted
Attention to Magnetic and Wireless Effects**

There are three classes of problems connected with total eclipses of the sun. The first class deals solely with the times of the different "contacts" of sun and moon, the second with physical conditions on the sun (chromosphere, prominences, corona), the third with the effects of solar radiation on the earth.

The problem of "lunar theory," dealing with the motion of the moon, is one of the most abstruse in astronomy, and has not yet been fully solved. Though it is possible to compute with great exactitude the effects of all known gravitational forces, the moon apparently refuses to be absolutely bound by them, exemplified by the fact that it was several seconds late in keeping its appointment with the sun on January 24 last. Hence the observation of the "contacts," or instants of beginning and ending of the partial and total phases of an eclipse, is important for throwing light on these obscure deviations.

Phenomena of the second class are present at all times, but it is difficult, and in the case of the corona impossible, to study them except when the full glare of sunlight is cut off at the time of eclipse.

Problems of the third kind deal mainly with magnetic and wireless effects. It is well known that abnormalities in solar radiation, such, for example, as those connected with sun-spots, have a very marked effect on terrestrial magnetism. It is also considered that solar radiation, through ionization of the upper atmosphere, has a good deal to do with conditions affecting transmission and reception of radio signals. It is therefore of importance, in both cases, to examine into the results of the cutting off of this radiation at times of eclipse.

In the case of the eclipse of January 24 it was known that conditions for visual or photographic observations would probably be quite unfavourable, both on account of the low altitude of the sun, with accompanying atmospheric disturbances, and because the chances were about two to one against a clear sky. It was therefore decided that the Dominion Observatory party should concentrate its energies principally on magnetic and wireless effects, while an attempt would also be made to observe the times of contact if the weather should be clear. This seemed the more rational since a co-operating party from the University of Toronto was making plans for photographic records of the corona, so that by the two Canadian parties practically the whole range of investigation was provided for. Both parties were located at Long's Corners, a few miles south of Hamilton, in the middle of the belt of totality. As it turned out, clouds entirely prevented all the visual and photographic observations planned.

The magnetic observations were distributed over three days, exactly the same program being followed on the day of the eclipse and on the preceding and following days, so as to afford a basis of comparison. Readings of magnetic declination (variation of the compass) were made every minute for about six hours on each day. The instruments and observers were housed in a large tent partially heated by a non-magnetic copper stove. Similar observations were made by other organizations at various points both within and without the zone of totality. Until all these observations have been reduced and compared it will be impossible to definitely disentangle the eclipse effects, if any, from the constant variations to which the magnetic elements are always subject. All that can yet be said is that certain deviations from the normal curve showed

CONSERVING CANADA'S BIG GAME

**Antelope Propagation in Captivity Successfully Carried On
in Nemiskam Park—Herd Numbers 235**

In a recent report from the superintendent of Nemiskam National park, officials of the Canadian National Parks Branch, of the Department of the Interior, have been informed that the herd of antelope now confined in Nemiskam park totals 235. This indicates a natural increase of 55 animals within the past year or a total increase of 193 since 1915. That the efforts put forth in the conservation of this nearly ex-

more than one thousand were in the entire Dominion and this estimate was based on authoritative data obtained from Provincial Government officials and others intimately acquainted with the species. Alberta had the largest portion of the remnants, there were a few in Saskatchewan, while Manitoba had practically none.

That this condition was realized by the Federal Government officials is



Conserving Canada's Big Game—Two fine specimens of antelope from the herd in Nemiskam National Park, Alberta.

tinct mammal should meet with such success is indeed highly gratifying to those who fostered the project. It would appear that success had at last crowned the repeated attempts made to preserve the species by propagation in captivity.

The history of Nemiskam National park is an interesting chapter in the story of wild life conservation. Overcoming what appeared to be insurmountable difficulties, forty-two antelope were enclosed in a fenced in area in southeastern Alberta in 1915 and, in contrast to previous experiments, continued to thrive in captivity. Their welfare and propagation, which was at first a matter of speculation, now seem to be definitely assured.

The antelope of the North American continent, as the prized trophy of the hunter and from the ravages of predatory animals, suffered such depletion in numbers that the extinction of the species was freely predicted by naturalists and conservationists. Dr. Wm. T. Hornaday, in "Our Vanishing Wild Life," published in 1913, prophesied that the antelope would be "one of the first species of North American big game to become extinct."

At that time Canada's supply of antelope seedstock was being severely reduced. It was estimated that not

themselves about the time of the eclipse, somewhat similar to effects that have been found at previous eclipses.

This was the first occasion on which eclipse effects on wireless receiving conditions have been investigated by scientific methods. As was perhaps to be expected in a first attempt, there does not appear to be a thorough agreement in the conclusions arrived at by all investigators. So far as the Dominion Observatory party is concerned, the general conclusion is that the shadow of the moon exerts the same kind of influence on radio reception as does the shadow of the earth; that is, the effects approximated to night conditions. On concert wave-lengths, where the most marked night effects are shown, the eclipse effect was also greatest; on both shorter and longer waves the effect was not so marked.

evidenced in the steps that were taken to secure protection for the antelope. From 1921 onwards the Dominion Government, through the Department of the Interior and acting in conjunction with officials of the Provincial Governments and sympathetic associations, had been endeavouring to formulate plans which would effect the enactment of protective measures.

One of the chief obstacles in the path of the conservationists was the natural temperament of the animals. They are delicate, capricious, and easily upset. Of a highly nervous disposition, the least excitement is apt to have a deterrent effect on them and in a great many instances the shock of capture, even when this captivity meant enclosure in spacious areas, was so great as to result in the early demise of the captives. Their fleetness of foot made capture by pursuit impractical, and weather conditions, impairing speedy flight, were sought as an aid.

From time to time officials investigated reports of herds in different localities. Expert advice was sought and while in some instances the size of the herds did not warrant action, in others climatic and geographical conditions were adverse. The antelope moved about from time to time seeking pasturage of their own particular choosing with the result that the investigators often reached the ground to find their quarry had departed.

In February of 1915 authentic reports that a fairly large herd had been located in southeastern Alberta caused an attempt at herding the animals into a corral to be made but without success. However it was the means of furnishing invaluable information for attempts made at later dates. The idea of capture by herding was abandoned for the conclusion that the establishment of a herd depended on the enclosing of the animals in an area of their own choosing.

Later in the year another herd of antelope—possibly part of the herd on which the unsuccessful attempt had been made in the spring—was located in an area that was known as one of their early summer habitats. The tract they were feeding on comprised approxi-

REGULATIONS

**GOVERNING SALE OF COAL IN
NATIONAL PARKS**

The regulations governing the licensing of businesses, trades, or occupations within Canadian National parks were amended by Order in Council dated February 3, 1925, so that every person selling coal by weight within the parks shall have all coal sold in quantities or loads of one thousand (1,000) pounds each or over, weighed on the scales maintained by the department for the use of the public. The fee for weighing coal shall be fifteen (15) cents per load.

**LONG TERM GRAZING LEASES IN
SASKATCHEWAN**

By Order in Council dated the 7th of February, 1925, an addition was made to the Dominion Grazing Regulations whereby the Minister of the Interior is authorized to issue twenty-one year grazing leases on vacant Dominion lands in the province of Saskatchewan in districts which are not suitable for farming. The Order in Council also authorizes the issue of renewal twenty-one year grazing leases covering lands now held under lease in Saskatchewan in districts not suitable for farming, on the condition that, upon inspection by an officer of the department, the lands affected are found to be unfit for agricultural purposes, and that the lessee is utilizing the leasehold to its full extent for stock-grazing purposes.

mately 5,000 acres and was already partly surrounded by a good post and barbed wire fence. With all possible speed and caution the barbed wire was replaced by a higher fence of woven wire and the antelope were successfully and securely confined by a fence that was both antelope and coyote-proof. The work was accomplished without disturbing the animals and forty-two of them were captured in this area of their own selection.

The reserve thus established was named Nemiskam National park in 1922 and it contains all vegetation peculiar and necessary to the antelope diet as well as an abundant water supply. It is situated a short distance from the town of Foremost and the supervision of the herd is in the hands of a resident caretaker.

Subsequently, experiments have been carried out in transporting some of the animals to other localities, but small success has attended these endeavours. Antelope have been taken from Nemiskam park to Buffalo National park in northern Alberta but although some of them survived the excitement of transportation, propagation has been of little consequence.

While small numbers of antelope still roam at large in Alberta and Saskatchewan they are constantly diminishing and the safeguarding of the herd in Nemiskam National park, besides being a heritage for the Canadian people, may mean the salvation of this gentle, graceful, and interesting mammal.

**RAILWAYS START MOVEMENT
TO PROTECT FORESTS**

(Continued from page 1)

Railways is to be commended for the constructive way in which they are seizing the importance of forest protection, and the excellent manner in which they are striving to urge upon their employees the great part which the railway employee can play in forest fire protection. Similar meetings have been held at other important points throughout Canada, and have resulted in much good work in advancing the cause of forest protection.

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APRIL 19 TO 25 PROCLAIMED "SAVE THE FOREST WEEK"

FOREST PROTECTION OF GREATEST IMPORTANCE

Royal Proclamation Appointing "Save The Forest Week" Stresses Need For Greater Precaution

A Royal Proclamation appointing the week of April 19 to 25 inclusive to be observed as "Save the Forest Week" has been issued by His Excellency the Governor General. The setting aside annually of a week during which the importance of forest protection from fire is to be specially stressed is one of the principal developments of the movement inaugurated last year.

The 1925 proclamation deals at length with the importance of the forest and indicates lines to be followed by all citizens in carrying out their part in the nation-wide effort at fire prevention. In outlining the situation it states that the protection and perpetuation of the Dominion's forests are vital to the continued industrial welfare and national strength of Canada and to the health, comfort, and prosperity of the Canadian people. The statistics of the several forest authorities of the Dominion show that the forest resources have suffered enormous losses through the occurrence of forest fires and that such losses have far exceeded in amount the depletion in timber wealth through legitimate cutting operations. In many cases forest fires result in disastrous loss of life, and of valuable property other than timber wealth, and in addition the vitality of the forest itself is seriously impaired, thus rendering it unduly susceptible to attack by insect and fungus pests.

The proclamation sets out that the forest industries in Canada, next to agriculture, constitute the most important source of the Dominion's national income, and that the extent to which prosperity is dependent on a stable supply of raw materials for these industries is not fully appreciated. Forest fires to-day through destruction of raw materials, threaten the very existence of these industries, and it is essential, if Canada is to retain and develop her position as an exporter of forest products, that the appalling wastage through forest fires be curtailed. Forest fires also disturb the equilibrium of stream flow, lower the water table, and frequently give rise to serious erosive effects.

It is further stated that the experience of all forest authorities in Canada has abundantly demonstrated that the forest fire problem can only be solved with the full sympathy, assistance, and active support of all the people. The

A MESSAGE FROM THE MINISTER OF THE INTERIOR

The more we study the role which the forest plays in our Canadian life—in industry, in recreation, and in its attractions to tourists—the more we stand amazed and appalled by the apathy of the majority of the people of this country toward our forest fire problem. We have not yet developed a national consciousness of the effects of forest destruction on employment, on railway traffic, on tourist business, and on the prosperity of hundreds of municipalities whose very existence is menaced when the forests burn.

The war has left this country burdened with debt, federal, provincial, and municipal. Taxation weighs heavily on the people, and fixed charges eat up funds which, in a young country, should go into improvements, public works, and similar constructive uses. In this unenviable state we not only ignore the necessity of conserving one of our greatest natural resources, but complacently watch the mounting losses from forest fires wipe out potential sources of taxation, which could, with proper care and forethought, prove a mighty asset in freeing us from the shackles which now bind us.

We have in this country a distinct concentration of population in urban centres. Many thousands of our people have no intimate contact with the forest, and forest destruction conveys no personal message to them as being a matter vitally affecting their welfare and the welfare of their children. Yet the ultimate loss is borne not solely by the lumberman who loses his timber, or by the settler who loses his home. It is shared by the railways, which have less freight to haul, and by the community, which loses tourist traffic—for what attractions has a fire-swept area denuded of timber and devoid of wild life? It is shared by the city manufacturer, who has less market for his produce in the fire ravaged district, and by his employees, who must work shorter hours in consequence. And finally, it is shared by you and me, who must pay higher taxes to make up the revenue which the country loses when the forests are destroyed.

There is another aspect of the situation which has not been brought home to our citizens. How many realize that in Canada, to an extent probably not equalled in any other country in the world, the forests belong to the people. The fact is that over 85 per cent of our forest area is in public ownership, held in trust for the permanent use and benefit of the people of this country. How are we Canadians protecting this property? Records show that ninety per cent of forest fires are the result of our ignorance and neglect. We are criminally careless, and are fast reaping the results of that carelessness in higher prices for lumber and other forest products in a country which should have the cheapest wood materials in the world. We are wasting our reserves at a time when the whole world is becoming aroused about an approaching timber famine—an economic condition which, were we protecting our timber supplies, would redound to our wealth and prosperity.

Curtailement of our present forest-fire losses is hopeless until such time as public opinion shall become aroused, shall demand punishment for carelessness with fire in the forest, and shall require effective precautions in logging and land clearing operations. In other words, FIRE PREVENTION is the only real cure for FOREST DESTRUCTION.

In order to bring these facts to the attention of the public, the Dominion Government, with the concurrence of the provinces, has proclaimed the week April 19 to 25 as "Save the Forest Week." It is the duty of every true citizen to give earnest thought to these matters, and to play his part in moulding public opinion to the necessity of conserving the great forest heritage of Canada.

CHARLES STEWART,
Minister of the Interior.

great majority of forest fires are attributable to inexcusable neglect and ignorance, and the exercise of prudence and carefulness would reduce the timber losses by fire in Canada to small proportions.

During the week of April 19 to 25 the people of Canada are earnestly entreated in the proclamation to consider this problem and to give careful heed to information disseminated by the various forest protective agencies, and in

particular to act upon the following suggestions:—

"1. That settlers and others engaged in the clearing of land should fully observe the fire laws of the Dominion and of the province, which laws have been enacted for their protection, as well as for the preservation of our timber resources;

"2. That at this time of the year, when thousands are looking forward to spending their summer vacations in the

(Continued on page 4)

IMMENSE LOSSES FROM FOREST FIRES IN WEST

Many Hundred Million Feet of Timber Destroyed In Western Canada Last Year

Conditions during the 1924 forest fire season in Canada were exactly the reverse of the previous year. In 1923 Eastern Canada suffered heavy losses from fire, while in the West only slight damage was done; whereas during the year just closed the western provinces, and Alberta in particular, were visited by 1,487 fires, while the East was practically immune. The total area fire-swept in the West was 1,185,345 acres. Of this gross area, 239,320 acres carried merchantable timber and 299,832 acres bore new growth, the remaining 646,193 acres comprising non-forested lands of various classes. The estimated loss of merchantable material reached the startling amount of 511,000,000 board feet of saw timber and 4,375,000 cords of fuel or pulpwood, the total combined value being \$2,406,000. A cash expenditure of \$81,725 together with rangers' time to a total of \$11,999 was expended in the actual suppression of these fires. Only 214 or 14 per cent of the total forest fires in the West occurred on Dominion forest reserves. The destruction on the latter amounted to 34,588 acres of mature timber and 33,820 acres of young growth.

Notwithstanding the efforts made to arouse public opinion to the immense losses which Canada is suffering through forest fires, devastating conflagrations continue. Federal, provincial, and railway forestry services were particularly busy last year in spreading the gospel of forest protection from fire. Of the 1,487 fires which occurred last year in Western Canada, 992 or approximately 70 per cent were discovered and extinguished before an area of ten acres in any instance had been covered. The percentage of fires detected and put out in the incipient stage reflects the efficiency being reached by forest protective organizations, and judged on this basis and in view of the specially hazardous season, the 1924 record is considered satisfactory. However the proportion of fires caused by careless and indifferent settlers, 28 per cent, and campers, 22 per cent, shows no diminution from previous years and indicates the great need for further publicity and educational work, as well as more rigid law enforcement. The railways caused 21 per cent of the fires but very few of these reached ten acres in area before they were extinguished. Lightning and

(Continued on page 4)

SUBSTANTIAL GAINS IN LUMBER PRODUCTION

Increases In Quantity and Value of Products of Industry in Canada in 1923

Further substantial gains in the quantity and value of products and by-products of the lumber industry in Canada are shown in the preliminary report for the year 1923, recently issued by the Dominion Bureau of Statistics. The total value of the 1923 output reached \$139,894,677 as compared with \$114,324,580 in the previous year. This places lumbering third among the manufacturing industries of the Dominion, pulp and paper being first, and flour and grist milling second.

Although there was a reduction in the number of mills operating from 2,922 in 1922 to 2,883 in 1923, the average production per mill increased from 1,071,000 feet to 1,295,000 feet. Sawn lumber, the principal product of the industry rose to 3,732,700 thousand feet, board measure, with a value of \$108,295,563. This production represents an increase of 18.9 per cent in quantity and 28.1 per cent in value over the previous year, but the total production still remains considerably below the 1920 mark of over four thousand million feet, board measure. Of the kinds of wood used in the production of lumber, spruce was the greatest contributor with a total of 1,164,832 thousand feet board measure valued at \$31,648,441. Douglas fir was a close second with 1,040,307 thousand feet worth \$27,025,661. White pine contributed 627,724 thousand feet valued at \$23,418,201; hemlock, 264,128 thousand feet valued at \$6,711,639, and cedar, 127,283 thousand feet valued at \$4,297,469.

Generally speaking other products and by-products of the saw-mill showed an increase. The production of shingles rose in quantity but declined slightly in value the 1923 figures being 2,718,650 thousand valued at \$9,617,114, as compared with the previous year's totals of 2,506,956 thousand at \$10,397,080. Laths registered a gain both in quantity and value. The year's output was 1,153,735 thousand, with a value of \$6,324,747 as against 1,031,420 thousand, worth \$5,690,328.

The cutting-up, and barking or rossing of pulpwood has now assumed considerable importance in Canada and is carried on as a side-line in many Canadian saw-mills. During 1923 there were 755,933 cords of pulpwood so prepared which were valued at \$9,730,861, as compared with 638,208 cords valued at \$8,273,686 in 1922.

The following tables include a summary of products for 1923 and the production of lumber by provinces:—

Products	Quantity 1923	Value 1923
Total.....		\$ 139,894,677
Lumber..M ft. b.m.	3,732,700	108,295,563
Pulpwood....Cords	755,933	9,730,861
Shingles.....M	2,718,650	9,617,114
Lath.....M	1,153,735	6,324,747
Sawn ties....No.	4,336,932	2,067,825
Slabs and edgings....Cords	339,761	916,023
Veneer...M sq. ft.	16,238	665,534
Pickets.....No.	3,124,900	467,657
Box shooks...No.	3,393,218	465,637
Staves.....M		275,600
Heading....M prs.		157,761
Poles.....No.	138,124	157,350
Spoolwood, M ft. b.m.]	3,082	148,704
All other products...\$		604,301

CO-OPERATE IN INVESTIGATIONS

Canadian Government and Pulp and Paper Association
Co-ordinate Forest Research Efforts

The Government of Canada by Order in Council on March 12, 1925, accepted the offer of the Canadian Pulp and Paper Association to co-operate in research work with the Department of the Interior by providing \$20,000 per year to enlarge the activities of the Pulp and Paper Division of the Forest Products Laboratories of Canada. The financial contribution from the Association is to continue for two years with the option of renewal for three years additional. How this offer of co-operation came about may be briefly explained. Since 1913 the Department of the Interior has maintained a research institution known as the Forest Products Laboratories of Canada. As the name indicates the institution covers, so far as resources permit, the whole field of forest products, of which pulp and paper form an important part. The pulp and paper division naturally could not be permitted to absorb so much of the activities of the laboratories as to reduce unduly the other divisions, while at the same time the tremendous expansion of the pulp and paper industry was daily bringing forward new problems clamouring for solution. Some research work has been done in the paper-mills, but the Pulp and Paper Association has for some time been looking for a way by which the greatest efficiency could be secured in attacking major problems by concentrating under one head in one fully equipped laboratory the work of both Government and Association experts.

With this end in view, after considerable preliminary discussion, a conference was held between officers of the Forestry Branch and a special committee of the Pulp and Paper Association at which the offer of co-operation was put in final form, and it is this offer which has been accepted by the Government.

One of the greatest obstacles to efficiency in the work of the Division in the past has been the continual changing of directing heads, due to resignations to accept more remunerative employment elsewhere. To obviate this the Association is, with the consent of the Civil Service Commission, taking over the services of the present chief of the Division for a period of two years and paying him a salary which will ensure his continuity in office. The Association will in addition supplement the present staff by technical employees of its own to work on special problems of particular interest to the industry. The ordinary governmental activities are fully safeguarded by the agreement and necessary government work is accorded precedence.

The details have been carefully worked out and it is confidently expected that this plan of linking up, for the prosecution of research work, the resources of the state and private associations in a form in which the interests of both are fully conserved, will result in substantial benefit to the pulp and paper industry and to the nation.

REVIEW OF OIL SHALE AREAS IN CANADA*

Most Promising Deposits Occur In New
Brunswick and Nova Scotia

Within recent years, the public, official bodies, and oil companies, have begun to appreciate the gravity of the situation that will arise, when petroleum supplies become so depleted as to be inadequate to meet demands. The situation as regards petroleum is nowise different from that of any other natural resource. When the supply of any commodity is plentiful and easily obtained, little attention is paid to conservation and efficient utilization; when the supply begins to fail, conservation is applied and possible substitutes are sought. Those who look beyond periods of temporary overproduction, realize that the problem of furnishing sufficient oil to meet the inevitable and rapidly increasing requirements, is indeed one of prime importance.

From time to time, reports by the Canadian Department of Mines, and investigations by private individuals, have created considerable interest in the potential value of Canadian oil shales, as a future source of liquid hydrocarbons. Production from such a source would apparently be relatively free from certain well recognized hazards that attach to present production of well petroleum.

In a bulletin prepared by S. C. Ellis, of the Mines Branch, Department of Mines, Ottawa (Mineral Resources Investigations 1921) the relative importance of various oil shale areas in Canada, is briefly reviewed. From information at present available, it appears that most promising deposits occur in the provinces of New Brunswick and Nova Scotia.

Certain of these deposits warrant careful investigation. They represent a large aggregate tonnage of valuable shale, and there is good reason to suppose that, under reasonably favourable conditions, they will eventually prove of sufficient merit to constitute the basis of a large and lucrative industry.

Commercial development will be determined by the question of supply and demand, for it may be assumed that efficient retorts, adapted to the treatment of various types of shale, will be developed. Apparently mining charges will constitute the most important single factor in production costs, and for the immediate present will adversely affect development. Exceptional instances may exist where shales

*Prepared under the direction of Dr. Charles Camsell, Deputy Minister of Mines, by Mr. S. C. Ellis, Mines Branch.

ORGANIZE CAMPAIGN ON DOMINION-WIDE SCALE

Representative Conference Plans to Arouse
Canadians to the Need of Forest
Conservation

For the purpose of bringing before the people of Canada in the most effective manner the objects of "Save the Forest Week" a conference of representatives of federal and provincial governments, and of the railways, industrial organizations, and patriotic bodies was held in Ottawa, March 23 and 24, upon the invitation of Hon. Charles Stewart, Minister of the Interior. The conference was eminently successful and before it concluded a Dominion-wide organization to carry on the work of spreading information regarding forest protection was effected. The headquarters of the central committee will be in Ottawa, and local committees will operate in each of the provinces.

The meetings of the conference were attended by delegates representing nearly every part of the Dominion, and great interest was shown in the subjects discussed. At the evening session on March 23 the proceedings were transmitted by radio from the broadcasting station of the Canadian National Railways, CNRO, and were heard with interest by thousands of citizens. Addresses were delivered on this occasion by the chairman Hon. Charles Stewart, Rt. Hon. Arthur Meighen and Mr. Robert Forke, M.P. The Prime Minister, Rt. Hon. W. L. Mackenzie King, was at the last moment prevented by parliamentary duties from attending. Others who spoke and whose addresses were broadcasted were: Dr. C. D. Howe, Dean of the Faculty of Forestry of the University of Toronto, Mrs. Charles Thorburn, First Vice-President, National Council of Women, and Mr. William McNeill, Managing Director of the Timber Industries Council of British Columbia.

The bodies represented at the conference included: the forest services of the Dominion Government and most of the provincial governments, the forest protective associations of Ontario and Quebec, the fire prevention departments of the Canadian National and Canadian Pacific railways, and of the Railway Commission, the Canadian Forestry Association, the three associations covering the daily and weekly newspapers and magazines of Canada, the Associated Boards of Trade of Ontario, Canadian Lumbermen's Association, Canadian Pulp and Paper Association, Quebec Forest Industries Association, British Columbia Timber Industries Council, Canadian Manufacturers Association, Canadian Society of Forest Engineers, Rotary and Kiwanis Clubs, National Council of Women, Imperial Order Daughters of the Empire, Boy Scouts, Girl Guides, etc.

The points which the conference felt should be stressed, in line with the proclamation of His Excellency the Governor General, were: that the forest was the source of Canada's second greatest industry; that three-fourths of Canada was incapable of agricultural production but well adapted to produce timber crops in perpetuity; that Canada's supply of softwoods was only two-thirds that of the United States despite Canada's larger forest area; and that the amount spent for forest protection in Canada was entirely inadequate and out of proportion to the revenue derived therefrom.

Vastly increased public vigilance, strict enforcement of forest regulations, and largely increased appropriations for forest protection were advocated, and a continuous and aggressive campaign against forest fires was urged as a regular program, in addition to "Save The Forest Week."

carry reasonably high values, and where conditions affecting mining operations are unusually favourable.

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OTTAWA, APRIL, 1925

RAPID PROGRESS BEING MADE IN AERIAL SURVEYING

REACHES HIGH STATE OF
EFFICIENCY

Over 40,000 Square Miles Covered During
Past Season in Various Parts of Canada

An outstanding feature of development work in Canada in the past three years has been the effort to apply aerial photography to surveying and map making. A preliminary report by the Controller of Surveys, under whose direction this work has been conducted, outlines the progress made during the past year by the Topographical Survey, Department of the Interior, in co-operation with the Royal Canadian Air Force, and discloses the fact that in this one year alone useful photographs were taken of areas in various parts of Canada aggregating over 40,000 square miles in extent. These photographs were found to facilitate greatly not only mapping operations and reduce their cost, but to be applicable to the requirements of many agencies connected with the development of the natural resources of the country.

The operations were carried on in various parts of Canada from the air bases already established. The bulk of the work performed was located in Manitoba where over 27,000 square miles of forested and mineralized areas were photographed. Operations in this province were carried out from the Victoria Beach air station on lake Winnipeg which was established principally for fire patrol purposes.

Operations in other provinces were as follows: In Nova Scotia the principal work undertaken was in mapping, for water-power and forestry purposes, the western portion of the province. Many small operations were carried out in Ontario in connection with forestry, parks administration, water-powers, public works, and ordnance lands. In Saskatchewan, the work was chiefly for forestry and geological purposes and for providing base maps for aerial fire patrols. Work in Alberta was principally for land classification, soil surveys, forestry, taxation, reclamation, and mapping. Due to the mountainous nature of the country causing distur-



Before and After Aerial Surveys—The above comparative illustrations of the Oiseau Sectional Sheet show the changes made possible by aerial photography in present day maps of forested and mineralized areas.

tion, only a few small experimental areas were photographed in British Columbia. These operations were carried out without mishap and the success attained was due in the largest measure to centralization and to the close co-operation of the Topographical Survey of Canada and the Royal Canadian Air Force.

With the Topographical Survey acting as the central organization for aerial surveys it has been possible during the past year to develop aerial photography to a very high state of efficiency in its practical application to map revision, forest mapping, and geological, water-power, and other investigations. This work had its inception in 1922, when a few experiments were successfully carried out. During 1923, advantage was taken of the existence in Manitoba of the aerial fire patrol service to conduct further experiments in connection with mapping comparatively inaccessible, but important, forested and mineralized areas. These experiments were successful and, in addition to providing valuable information upon which to base future operations, actually enabled the Survey to publish the map of The Pas mineral area which was the most complete map of its kind ever issued.

In 1924, the third year, the methods evolved during the previous year were introduced into the regular work of the Topographical Survey and over 35,000 square miles of forested and mineralized areas and areas of importance to tourists and hunters, and railway, water-power, and park administration were covered by oblique photographs; that is photographs taken with the camera pointed over the nose of the plane and inclined to give a perspective view of the country from just in front of the plane to the horizon. In addition, over 4,200 square miles in settled areas in various parts of the country were photographed vertically, or with the camera pointed directly downward toward the ground thus giving great detail.

The development of aerial photography in connection with forest pro-

tection as a supplementary agency to actual aerial fire patrol is a decided step in advance in the work of safeguarding the timber resources. The photographs and the accompanying maps prepared by the Topographical Survey are on this work applied in three phases, first, for routing of fire detection planes, second, for mapping timber stands and timber types and surrounding swamps and other natural fire checks and, third, for guiding actual fire fighting operations.

One of the most outstanding operations carried out successfully during the past year was in connection with land classification and soil surveys. With the aid of the photographs one party was able to map and classify completely seventy-two townships or 1,658,880 acres for settlement purposes, or almost twice as much as was done by two parties the previous year without the photographs. The resultant maps will show accurately all important de-

IDENTIFYING APPLE VARIETIES

The identification of apple varieties by leaf characteristics is making rapid progress. Some four years ago the first steps were taken by the Horticultural Division of the Experimental Farms to study these characteristics. However, the results were not entirely satisfactory, and two years ago a new start was made in this study, when it was made a rule to take the leaves only from about one foot to one and a half feet from the tip of the branch, on new wood only. By this method a very uniform type of leaf is obtained.

The outstanding characteristics and points were carefully noted and from these it was found to be possible to name each variety from the character of the leaf alone. The importance of being able to tell whether or not a tree is true to name before it comes into bearing is readily appreciated. If found not true to name it can be replaced at once and much time and loss saved.

In 1923 there were 333 establishments in Canada manufacturing products from metals other than iron and steel. These included 11 plants producing aluminium and aluminium wares; 81 plants fabricating brass and copper products; 20 plants in the white metal trade; 97 plants manufacturing precious metal products; 108 plants making electrical goods; and 16 plants making miscellaneous articles from non-ferrous metals.

An interesting point in connection with the collection at St. John hatchery, New Brunswick, is that over 1,000,000 speckled trout and over 79,000 Brown trout eggs were taken at the ponds from parent fish, which themselves had been reared at this point from the fry stage.

fields, including bush areas, openings, swamps, houses, ploughed lands, creeks, soil types, and other features of interest to the settler.

Navigation of the air has accomplished much in many fields and great strides have been made in other countries in applying aircraft to useful purposes, but it is doubtful if any country presents a wider scope for its practical application than Canada. Not only does it offer a new means of efficiency in rapid delivery of mail, transportation, and fire patrol of forests, but the work accomplished during the past year has demonstrated that it has opened a new field to the geographer, the geologist, the forester, the water-power engineer, the railway locator, the prospector, in fact to practically every expert connected with the development of natural resources.



Aerial Surveying in Canada—This picture illustrates the methods used in aerial surveying. The plane is shown taking vertical photographs, which when developed are used to plot the area on maps.



Immense Losses from Forest Fires. Aeroplane view of a forest fire in green timber in northern Manitoba. An aeroplane is shown landing in the lake at the left.

IMMENSE LOSSES FROM FOREST FIRES IN THE WEST

(Continued from page 1)

incendiarism each were responsible for about 5 or 6 per cent. It is encouraging to note that the proportion of fires marked "cause unknown" is being steadily reduced.

Proceeding from the East there was a gradual heightening in the fire hazard through the West. Manitoba had a normal season and despite the fact that 310 fires were reported, the total area burned over was only 48,000 acres, or 54 per cent less than 1923. A total of 3,500 acres of this was mature timber. In Saskatchewan fairly heavy fire losses were sustained. Two hundred and forty-eight fires occurred, sweeping an area of 502,000 acres, and destroying 158,000 acres of merchantable timber and 153,000 acres of young growth. The summer season of 1924 in Alberta was unusual in that the weather conditions in the northern and southern parts were very different. In the south half the fire hazard was about normal but north of Edmonton, extreme conditions existed until near the end of July. The inaccessibility of the country in which these conditions prevailed resulted in probably the greatest forest fire losses in the history of the province. There were 641 fires covering an area of 615,000 acres. In the Dominion Railway Belt of British Columbia the season was one of severe hazard. A total of 283 fires occurred, 67 per cent of which, however, were under ten acres in area. The total area burned over was 18,449 acres.

FOREST PROTECTION OF GREATEST IMPORTANCE

(Continued from page 1)

woods, all should take cognizance of the fact that the camp-fire, which is one of the most pleasant and valuable adjuncts of camp life, may, if neglected, easily result in disaster; and that to prevent repetition of such losses as have been annually sustained from this cause, all persons should familiarize themselves with the proper methods of building, using and extinguishing such fires;

"3. That loggers, saw-mill operators and others interested in timber operations should see that all equipment and appliances designed to prevent the origin or spread of fires shall be overhauled and placed in a state of thorough repair; that such persons should review with care the fire protection requirements of the legislation under which they operate; and that they should see that all employees working under their direction are properly instructed as to the danger of fire."

FISHING INDUSTRY OF PRINCE EDWARD ISLAND

The 1924 Catch Had Market Value of Over One Million Dollars—Lobster Pack Smaller

The most important of the four great fishing areas of the world is situated off the coast of Eastern Canada. Fishing is the oldest of all Canadian industries, and one of the principal industries of Prince Edward Island. During the calendar year 1924, the yield of the fisheries of the island province had a total marketed value of \$1,201,772 according to the Dominion Bureau of Statistics. This was a decrease from the preceding year of \$553,208. The drop was due chiefly to the smaller lobster pack, which comprised 28,814 cases valued at \$681,575, as compared with 43,831 cases in 1923 valued at \$1,278,945. The catch of lobsters was 65,893 cwt. as against 97,456 cwt. the previous year. The number of lobster canneries in operation during 1924 was 145, a decrease of 50 from the preceding year.

Increases were recorded in the catch of cod, hake, cusk, mackerel, smelts, clams, quahaugs, and oysters and decreases in the catch of herring and haddock. The value of the total catch of fish at the vessel's side was \$829,171. Three clam canneries and one fish curing establishment operated during the year.

The value of the fisheries of the province during the past ten years is shown below:—

1915..	..	..	..	..	..	\$	933,682
1916..	..	..	..	..	..		1,344,179
1917..	..	..	..	..	..		1,786,310
1918..	..	..	..	..	..		1,148,201
1919..	..	..	..	..	..		1,536,844
1920..	..	..	..	..	..		1,708,723
1921..	..	..	..	..	..		924,529
1922..	..	..	..	..	..		1,612,599
1923..	..	..	..	..	..		1,754,980
1924..	..	..	..	..	..		1,201,772

GRAIN YIELDS OF THE PRAIRIE PROVINCES

The total grain yields of the three Prairie Provinces (Manitoba, Saskatchewan, and Alberta) are finally estimated as follows: Wheat, 235,694,000 bushels from 21,066,221 acres; oats, 229,046,000 bushels from 9,199,426 acres; rye, 11,588,000 bushels from 743,039 acres; flaxseed, 9,577,900 bushels from 1,265,895 acres.

POWER AND THE MINING INDUSTRY

Part Played by Hydro-electricity in Development of Northern Ontario's Resources

The whole of the province of Ontario lying north of the latitude of North Bay is referred to generally as northern Ontario, which twenty years ago was looked upon as a wilderness, across the southern fringe of which the railway joining Eastern and Western Canada had to make its way. This railway led to the discovery of nickel-copper ores in the vicinity of Sudbury, and gold in the Lake of the Woods region, but the electrical age was then but dawning and the metallurgical uses of nickel were only developing, so that, important as the Sudbury discoveries were, their market was not yet ready.

The building of the Temiskaming and Northern Ontario Railway northward from North Bay to open up this territory met with prompt results, for during its construction silver was discovered and the Cobalt silver camp resulted. Quite naturally Cobalt proved a tremendous attraction to prospectors, and during the intense and widespread prospecting which followed a number of important gold discoveries were made, the most important of which were in the Porcupine and Kirkland Lake areas.

While ores rich in silver or gold can be profitably worked by primitive means a definite industry which will make it possible to treat comparatively low-grade ore could not be established without an ample and cheap supply of power. For a while during the early stages the native wood supplies sufficed but, as these were used up, a new source became necessary, and, as there was no indigenous supply of coal or oil, the mining men turned naturally to water-power of which there were ample resources and in which type of power much development had already taken place near the centres of population in Canada.

While the activities in silver and gold mining were developing, the electrical industry was making tremendous strides and the copper-nickel ores of Sudbury acquired greater value as a large and growing market for copper opened up. The nickel for a time lacked a large market but metallurgists engaged in the iron and steel industries were steadily developing alloys requiring nickel, and during the war the nickel requirements reached enormous proportions. With the cessation of hostilities the demand for nickel dropped, but, with the exhaustion of the war stocks and the growth of nickel consumption in peacetime activities, the nickel-copper industry of the Sudbury region is rapidly swinging into a large output.

The total output of nickel to the end of 1923 was approximately 471,000 short tons while during 1923, 58,000 tons of "matte" containing 31,000 tons of nickel and 16,000 tons of copper were produced. The refining of "matte" in Canada began in 1918 and during 1923, 32,000 tons were refined in this country. All this production was made possible by water-power, and there are at present eight hydro-electric stations with a capacity of 40,000 horse-power, developed primarily for this industry.

The silver industry made considerable progress without water-power but with the exhaustion of the richer deposits further profitable mining required more and cheaper power. The first develop-

ment was established in 1910 and 26,000 horse-power is now employed in the silver regions of Cobalt and Gowganda. The total output of silver to the end of 1923 was nearly 342,000,000 ounces, and the industry is now consolidated under a few large corporations and is maintaining a steady output of about ten million ounces annually.

Unlike silver, the gold of Porcupine and Kirkland Lake did not lend itself to profitable exploitation without the use of ample power and the development of power on the Mattagami river at two sites, one in 1911 and the other in 1912, was required before large-scale production became possible. From 1909 to the end of 1923 the total production of gold in Ontario amounted to \$125,407,616, of which about 88 per cent came from Porcupine and 9 per cent from Kirkland Lake. The present installation used for the Porcupine field consists of six hydro-electric developments aggregating 76,100 horse-power, having been recently raised to this figure by a 24,000 horse-power development on the Abitibi river and a supply from the Quinze river in the province of Quebec where the initial 20,000 horse-power of a 60,000 horse-power ultimate development is now ready. The Quinze development may also be drawn upon to provide power for the new Rouyn field in Quebec. The Kirkland Lake area is at present supplied from power plants primarily developed for the Cobalt mining areas.

The investigations of the Department of the Interior made in co-operation with the provincial authorities show that the water-power resources of northern Ontario are well distributed and there is little doubt that they will prove adequate, both for mining and for the large consumption of the pulp and paper industry which shares with it the main industrial activity of northern Ontario. These investigations show that there are upwards of 250 sites existing on the rivers flowing through this territory which have, it is estimated, a combined capacity of three-quarters of a million horse-power under ordinary minimum conditions and nearly twice this amount for six months of the year. The pulp and paper and mining industries supply a heavy and usually well sustained load, so that it is not certain that it would be correct to estimate the justifiable future installation on the same basis as is usually done for the country as a whole, nevertheless it is probably quite safe to say that less than one-sixth of the available power has so far been developed and that consequently water-power can supply all mining requirements for some time to come.

CANADIAN WOOL CLIP, 1924

The Canadian wool clip of 1924 is estimated at 15,111,719 pounds of the value of \$3,777,930, as compared with 15,539,416 pounds, of the value of \$3,160,000 in 1923.

It is estimated that the production of farm eggs in Canada for 1924 was 212,648,685 dozens of the value of \$50,322,439, as compared with 202,186,508 dozens of the value of \$48,770,780 in 1923.

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ISSUE REPORT ON COKE FOR HOUSEHOLD USE

INVESTIGATION COMPLETED
BY FUEL BOARD

Large Percentage of Domestic Needs in Central Canada Can be Supplied by Coke

In pursuance of the duties assigned to it when it was established in 1922, upon the recommendation of the Minister of Mines, Hon. Charles Stewart, the Dominion Fuel Board has just issued an exhaustive report on "Coke as a Household Fuel in Central Canada". The report gives the result of the investigation of the possibilities of coke as a domestic fuel conducted during the past year for the board by Mr. J. L. Landt, consulting engineer. The conclusions arrived at are so striking as to cause great interest to be centred on this subject, as for example the statement that 52 per cent of the domestic fuel requirements of the acute fuel area of Ontario and Quebec could be supplied with by-product coke manufactured in conjunction with gas to meet the present gas consumption of the area.

By-product coke ovens, it is pointed out, can only be economically operated where there is a market for the gas produced. Strategic points indicated as especially suitable for plants are Port Colborne, London, Toronto, Ottawa, Montreal and Quebec. Industries around Port Colborne would furnish a large industrial demand for the gas produced, whilst in the other centres mentioned there is a domestic as well as an industrial demand. One of the most up-to-date by-product coking plants on the continent, with a capacity of 320 tons of coke daily, was built last year in Hamilton and is supplying that district with both coke and gas.

The fuel situation in Canada is now pretty well understood, namely, that there is plenty of coal in the east and west but none in the centre—the thickly populated areas of Ontario and Quebec. Here hydro-electric energy is available for industrial power purposes but is not applicable to domestic heating.

Dr. Charles Camsell, Chairman of the Fuel Board says in his foreword to the report.

"The most urgent phase of the fuel situation in Canada is that of a domestic fuel supply for the province of Ontario and the western part of the province of Quebec. Our dependence on anthracite of foreign origin with which to heat the homes of the people of this part of Canada has been one of the most unsatisfactory situations in the

(Continued on page 4)

MOUNTAIN CLIMBING IN CANADA

Canadian Rockies Attract Climbers From Many Parts of World—Great Extent of Field

There is one feature about the Canadian Rockies that has not been appreciated as yet in this country, and that is the reputation which these mountain ranges have with the most experienced mountain climbers of the world. It will surprise some to learn that many parts of the Rocky mountains are exceedingly

hazards, and to conquer the unconquered; and in the intervals they spread the news and impart their visions to others. The great Alpine societies in different parts of the world maintain journals devoted to mountain climbing and every year scores of profusely illustrated books and pamphlets are pub-



Circus valley, Jasper National park—"Now the violet tint was upon us, but the summit of the mountain was still burnished with a line of bright gold. It died away, leaving a lovely red, which, having lingered long, dwindled at last into the shade in which all the world around was enveloped, and left the sky clear and deeply azure."

well known in Europe and in the United States, and that men who have for years spent their holidays in the Alps are now coming to Canada year by year. The reason for this fact is the great extent of our climbing field—twenty times that of Switzerland—the excellent character of the climbing, and the accurate maps of those portions that have been surveyed.

The notable thing about mountain climbing as a form of recreation is the fascination which it has for those who have been initiated into its delights. When they find a region where the game can be played to the best advantage they return year after year to try new

lished at the expense of societies and individuals, describing the feats of past seasons. The point is that to-day more space than ever before is being devoted to the Canadian Rockies. A perusal of these writings shows that this territory appeals to Alpinists as containing vast virgin fields of the finest territory for climbing. The opportunity to go "Behind the beyond," to adventure into regions where like the Ancient Mariner the tourist would find the exclamation rising to his lips,

"We were the first that ever burst
Into that silent sea."

(Continued on page 2)

SEISMOGRAPH IS INSTALLED IN SOUTHERN QUEBEC

DEPARTMENT OF INTERIOR
EQUIPS NEW STATION

Is Situated Near Scene of Recent Shocks —Interim Report on February Quake

A sixth seismograph station, which will assist in the work of those maintained at Saskatoon, Halifax, and Ottawa, by the Dominion Observatory and at Victoria and Toronto by the Meteorological Service, has been established at Ste. Anne de la Pocatière, Quebec, by the Department of the Interior. The new station is situated near the centre of the area affected by the earthquake of February 28. As indicated below the officers of the Dominion Observatory do not anticipate any further serious shocks, and the object of the installation is to study better the slight tremors which may occur from time to time in this area as a natural consequence of the more intense quake, as well as to secure a seismological record for this part of Canada.

The major disturbance of February is still under investigation by the seismologist of the Dominion Observatory. In reply to a query in the House of Commons recently, Hon. Charles Stewart, Minister of the Interior, presented an interim report on the earthquake investigations, which apart from details reads as follows:—

"The data given in this preliminary report were gathered during a trip of investigation covering the north shore of the St. Lawrence between Quebec and Murray Bay, the south shore from Lévis to Trois Pistoles, and the Lake St. John region as far east as Ha Ha bay. The two chief objects were the listing of evidence indicating the epicentre, or origin, and an examination into the truth of the reports of damage sustained. The first object has been attained in a tentative way, and the second fairly definitely for the area concerned.

"Without going into details it may be said that at present it is thought that the epicentre is in the mountainous region near the eastern boundary of the Laurentides Park. However, that section of the country is practically inaccessible at this season, and data can be better gathered there later, if promised reports from lumbering companies, together with other information already accumulated or still to come should not serve to settle the question definitely.

"The fact must be recognized that considerable serious damage was done at several points; on the other hand, many of the reports were exaggerated and

(Continued on page 4)

INDIANS OF PACIFIC COAST ARE PROGRESSING*

Wards of Canadian Government in British Columbia Are Engaged in Many Occupations

Recent reports on the economic condition of the Indians of British Columbia indicate that like the tribes of the other western provinces of Canada they are rapidly adapting themselves to the ways of the white man and gradually becoming self-supporting and independent. The diverse geographical nature of the province and the varying character of its resources create a natural variance in the lives and occupations of the Indians, and it is a matter of gratification that in the majority of instances these wards of the Government are successful in their undertakings.

The total Indian population in the province of British Columbia, according to a census published last year by the Department of Indian Affairs, numbers 23,782. They are divided into no less than eight distinct linguistic stocks of entirely different racial origin. In British Columbia, as in the other provinces, the Indians are located on reserves under the supervision of the Department of Indian Affairs. Schools are maintained for them by that department and their health is cared for by a staff of departmental physicians. In the more settled parts of the province the residential Indian schools are of a most efficient and up-to-date character. In these institutions the young Indians receive special training designed to fit them for occupations that will enable them to take their place in life as self-supporting members of the community.

In the southern interior of the province, in the Lytton, Kamloops, Okanagan, and Kootenay districts, the Indians are largely engaged in stock raising and fruit farming. In the latter industry they are instructed in the care of their orchards by a member of the staff of the Department of Agriculture and excellent progress is being made. In the cattle raising industry the Indians of the Okanagan and Kamloops agencies have been remarkably successful.

The Indians who dwell along the coast earn their livelihood principally by fishing. In many instances they own their own motor-boats, nets, and gear. The Haidas of Queen Charlotte island are particularly progressive. They own and operate a plant for extracting oil from the oulchan fish. The coast Indians of British Columbia are an important factor in the fishing industry. The Indian women are predominant as employees in many of the larger canneries and they are very competent in their work.

Indians of the southern part of Vancouver island are particularly successful in raising and disposing of strawberries, raspberries, and loganberries. The Indians also find profitable employment in the logging camps and in the hop fields. The older Indians still derive considerable revenue from the manufacture of baskets and Indian wares.

In the remote northern interior the Indians are still largely dependent upon hunting and trapping for their livelihood. In more settled parts of the province, for the most part, they now have comfortable frame houses of modern construction and the old log shacks are rapidly disappearing.

The following figures taken from the

*Prepared under the direction of Dr. Duncan C. Scott, Deputy Superintendent General of Indian Affairs, Canada.

CANADA A LEADING GOLD PRODUCER*

Ranks Third Among World's Producing Countries—
Greatest Annual Output Reached in 1924

Gold has been found in every province of Canada except Prince Edward Island. The first recorded discovery was made in 1824 on the Gilbert river, 50 miles south of Quebec city. Placer mining commenced here in 1847 and intermittent operations have been carried on here ever since. Placer discoveries were made in Ontario, in British Columbia, and in Yukon at much later dates. Lode mining began at Tangier river, Nova Scotia, in 1858. Records of the production of precious metals in Canada prior to 1887 are scattered and irregular; since that date complete data are available. These records show that between 1858 and 1923 Canada produced 24,774,684 ounces of gold, valued at \$512,137,838. During the last few years, owing to the discovery of the new gold fields in northern Ontario, there has been a steady increase in Canadian gold production; more than enough to offset the decline of the Yukon placers. Last year (1924), according to preliminary figures, the total production was the greatest yet recorded being 1,516,360 ounces, valued at \$31,345,941. More than 80 per cent of this production was obtained from the mines of Porcupine and Kirkland Lake in northern Ontario and 15.6 per cent from British Columbia.

The world's total production of gold has been declining since 1912, but Canada's rate of production is still on the increase. In 1922 she stood third among the countries of the world as a producer of this metal. At present production is at the rate of about \$100,000 per day, and this rate will probably continue to rise for some years.

The discoveries made in the Porcupine district during the period 1905-1920 have disclosed the most important new gold producing area found anywhere in the world during the last quarter century. More recent discoveries in the Rouyn district of northwestern Quebec, east of Porcupine, promise well for the future. Canada still possesses immense areas of

unprospected territory underlain by similar ancient crystalline rocks and there is an excellent chance of future discoveries surpassing any that are now known.

*Prepared under the direction of Dr. Charles Cammell, Deputy Minister, Department of Mines, by A. W. G. Wilson, Ph.D., Mines Branch.

WHALING OFF THE PACIFIC COAST

Industry Still Ranks Important Among Fisheries of British Columbia

Whale hunting off the coast of British Columbia is of very considerable importance. Notwithstanding the fact that there has been a gradual diminishing in the supply of whales on the Pacific coast, the value of the products of the year's catch ranks high and in 1923 the 455 whales taken yielded an income of \$332,781. The industry has been carried on by different companies, each in turn taking over the plant of the previous one. The whole industry on the Pacific coast in both Canada and the United States is now under the control of the Consolidated Whaling Corporation. The following figures show the number of whales taken during the fourteen years up to 1923:

Year	Number
1910..	958
1911..	1198
1912..	1107
1913..	705
1914..	573
1915..	229
1916..	403
1917..	379
1918..	500
1919..	432
1920..	493
1921..	No operations
1922..	187
1923..	455

MOUNTAIN CLIMBING IN CANADA

(Continued from page 1)

is the magnet which draws these experienced climbers.

The constant stream of lectures, magazine articles, and pamphlets about mountain climbing in the Canadian Rockies benefits Canada in many ways. It attracts to this country leading people who have leisure and inclination for travel and makes Canada better known abroad. All of this aids in the settlement and development of Western Canada. But the greatest benefit of all is the assurance to our own citizens that there is no need to go to far fields, that in the Canadian Rockies there are magnificent opportunities for this form of recreation.

The appeal of the mountains is broad. They appeal to the fit and to the sick, to young and old, to those who travel by motor and to those who glory in horseback riding or in conquering the heights on foot,

"Unto each the voice and vision,
Unto each his spoor and sign;"

All these forms of attraction are in the Canadian Rockies. They give health and rest to busy men and women, inspiration to the poets and painters, new areas for the botanist, and fields of climbing achievement to which Alpinists come from the ends of the earth.

PRODUCTION OF BEET SUGAR IN CANADA

Success of Industry Depends on Cheap Fuel, Efficient Labour, and Supply of Beets

The profitable development of the beet sugar industry in Canada is a question of great interest and importance to both the agriculture and commerce of the Dominion. The production of Canadian home-grown sugar is not, as yet, a large and widespread industry, although reports indicate that extensions are now under way. The production of sugar beets fluctuates from year to year but the following figures for 1923, supplied by the Dominion Bureau of Statistics show the extent of the industry in that year: acres sown to sugar beets, 17,941; yield in tons, 159,200; value of crop, \$1,922,668; total production of granulated sugar from beets, 39,423,160 pounds.

Among the more important factors which contribute to the successful production of beet sugar in Canada are efficient labour, cheap fuel and limestone, and an adequate supply, within reasonable distance, of high-quality beets. It was with respect to the quality—the richness and purity—of Canadian-grown sugar beets and the influence thereon of soil and climatic conditions as occurring and prevailing in various parts of the Dominion, that the Department of Agriculture inaugurated an investigation in 1902 and continued it to date. The results unquestionably prove that beets of excellent quality for this purpose can be raised in many widely separated portions of Canada, as shown by field experiments carried on at a number of points from Prince Edward Island in the East to Vancouver island in the West. In outline the plan has consisted in growing beets of approved varieties for sugar production on the larger number of the farms and stations of the Experimental Farms system, and analysing as to richness and purity, a representative sample of the harvested crop. The products of both home-grown and imported seed were tested, and it is a matter of considerable satisfaction that Canadian-grown seed has given excellent results fully equal to those obtained from imported seed of the best factory varieties.

There are approximately 160 arborescent species of hardwoods, and 31 species of conifers, or softwoods, in Canada. Of these, only 23 species of softwoods and 32 species of hardwoods can be considered as commercially important. The conifers form over 80 per cent of the standing timber, and 95 per cent of the lumber and pulpwood produced. The hardwoods are chiefly used for fuel, but they also furnish considerable lumber for flooring, interior finish, cooperage, turnery and other wood-working industries.

The hullless variety of oat named Liberty, originated at the Central Experimental Farm, Ottawa, Canada, has been used for four years in experimental work carried on by the Ontario Agricultural and Experimental Union. The average yield during the past two years was 34.14 bushels to the acre, standing in fourth position in the varieties tested over the province.

Exports of agricultural and vegetable products from Canada during 1924 were valued at \$445,516,290, an increase of \$29,305,300 over 1923. Wood and paper exports ranked second last year with a total of \$255,389,780.

latest report of the Department of Indian Affairs show the value of the income derived from different sources by the Indians of British Columbia. They give a good idea of the progress being made by the wards of the Government on the Pacific coast.

Source of Income	Total Value
Farm Products.. . . .	\$ 786,137 00
Beef Products.. . . .	69,970 00
Timber sales.. . . .	66,485 89
Land Rentals.. . . .	24,805 99
Fishing Returns.. . . .	501,416 00
Wages Earned.. . . .	643,427 00
Hunting and Trapping.. . .	470,667 00
Other earnings.. . . .	285,354 00
Annuities.. . . .	26,564 68

Total.. \$2,874,827 56

Tests made at the Forest Nursery Stations of the Forestry Branch of the Department of the Interior, show that hardy conifers such as spruce, lodgepole pine, jack pine and Scotch pine are particularly suited for prairie planting and thrive under adverse conditions. These trees are now being widely planted throughout the Prairie Provinces.

Canada's exports during the calendar year 1924 reached \$1,058,057,898 as compared with \$1,014,944,274 in the previous year.

NATURAL RESOURCES
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MinisterW. W. CORY, C.M.G.,
Deputy Minister

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OTTAWA, MAY, 1925

The late J. J. McArthur

The death on April 14 last of Mr. James Joseph McArthur, D.L.S., until his retirement a few months ago the Canadian Commissioner on the International Boundary Commission, brought to a close a long and interesting life of service to the Dominion in the Department of the Interior.

The late Mr. McArthur entered the public service in 1881 and during his forty-three years of labour he was in the vanguard of those assisting in the development of Canada. His duties as a surveyor carried him throughout the length and breadth of the Dominion and for the last twenty-five years of his life he was called upon to take a prominent part in the delimiting of Canada's boundaries.

His first duties in the government service consisted in the surveying of the meridians and base lines of the North West Territories. In 1887 he was the first to make practical use for survey work in the Rocky mountains, of the system of phototopography developed by the late Dr. Deville. He continued in this line until 1893 when he was appointed to the staff of the late Chief Astronomer, Dr. W. F. King on the Alaskan Boundary survey.

Exploratory work in Yukon Territory occupied his attention from 1897 to 1899 and in the latter year he attended the conference at Washington of the Joint High Commission as member and topographic expert. The years from 1901 to 1903 found Mr. McArthur engaged in survey work on different sections of the International Boundary and in 1903 he was attached as technical adviser to the staff of the British counsel before the Alaska Boundary tribunal in London.

The following year he took charge of the demarcation of the International Boundary from the gulf of Georgia on the Pacific coast to lake of the Woods and was engaged on this work until 1916. He was appointed His Britannic Majesty's International Boundary Commissioner in 1917 and during his remaining years in the service he continued as commissioner in general charge of International Boundary matters.

Mr. McArthur was possessed of a forceful yet genial personality which not only secured for him the unwavering loyalty of his staff and the cordial co-operation of the members of the United States Boundary Commission but also enabled him to make for himself an international reputation in the line of endeavour to which he had devoted his life.

CANADA'S 1925 FLYING PROGRAM*

Extensive Work Assigned to Royal Canadian Air Force—
Patrols and Surveys Are Largest Items

The program of flying operations to be carried out during the coming season for the various branches of the Government service by the Royal Canadian Air Force was drawn up at the recent annual inter-departmental conference on flying operations held at Ottawa. The conference was under the

ern part of northern Manitoba and by the inclusion of the northern part of the Clearwater forest reserve in western Alberta in the area to be patrolled. Rapid progress is being made in perfecting organization and developing equipment which will ensure maximum efficiency in forest fire detection and



Canada's 1925 Flying Program—Aeroplane view of Lunenburg, Nova Scotia, showing the harbour with the fishing fleet at anchor.

chairmanship of the Deputy Minister of National Defence and representatives from twenty branches of the Dominion Government service were present. It was announced that thirty-three aircraft would be available for civil government operations, distributed at the various stations as follows: Dartmouth, N.S., air station, 2; Ottawa air station, 4; Manitoba area, 16; High River, Alberta, air station, 7; Vancouver air station, 4. One or more aircraft at each will be fitted for aerial photography.

The growing importance which aviation is assuming in carrying on the work of various branches of the Dominion Government service is shown by the increasing demand on the pilots and equipment of the Royal Canadian Air Force. As in the past the work of the Department of the Interior is the largest item on the program. The plans for 1925 show extensive work for the Forestry, Topographical Surveys, National Parks, Water Power and Reclamation, International Boundary Commission, and Ordnance Lands branches of the department.

In the program outlined hereunder photographic operations for the coming season show a notable increase over the work called for in 1924, when 40,000 square miles were covered by aerial photography. The 1925 program includes at least double last year's area. The major part of the photographic work will be done for the Topographical Surveys Branch of the Department of the Interior in connection with its aerial surveys. The actual mapping is under the Topographical Survey.

Forest patrol work has also been extended by the addition of a new sub-station near The Pas to serve the west-

prevention at costs within the economic means of forest authorities. The Royal Canadian Air Force and the Dominion Forest Service are bending all their energies to this end.

Details of the coming season's program are given below:—

Department of Agriculture.—Investigation of the upper atmosphere in connection with the spread of the wheat rust diseases; continuation of work on white pine blister rust control.

Department of Customs.—Continuation of patrols for preventive service.

Department of Indian Affairs.—Transportation for parties paying Treaty money in northern Manitoba.

Department of Marine and Fisheries.—Fisheries patrols in northern British Columbia.

Department of Mines.—Vertical photography for mapping an area north of Georgian bay.

Department of Public Works.—Photographic survey of the Portland Canal, B.C.

Department of Railways and Canals.—Photography of Hudson Bay Railway line and Churchill River district.

Department of the Interior

Topographical Surveys.—Vertical photography for mapping Windsor, N.S., and Fredericton, N.B., sectional sheets; oblique photography for mapping the counties of Annapolis, Queens, Kings, and Lunenburg, N.S.; vertical photography of Three Rivers, Que., and Kitcheener, Ont., sectional sheets, and of areas in the upper Gatineau watershed and Rouyn mineral areas, Quebec; oblique photography of the Churchill river from Fort Churchill, Manitoba to Pakkatawagan; completion of oblique photography in The Pas mineral area; extension of previous photographic sur-

WIRELESS IN THE FAR NORTH

North West Territories and Yukon Station Will Be Erected at Ak'avik This Summer

It has been decided to establish the most northerly main station of the North West Territories and Yukon Wireless System at Ak'avik in the Mackenzie river delta. Ak'avik is more than 2,000 miles north of Edmonton by the regular travelled routes and is the terminal of the Mackenzie river navigation and the northern winter mail service. Accessible to the inhabitants of the Arctic coast in summer and winter, it has become the centre of the fur trade from Coronation gulf to the Alaskan boundary.

The Royal Canadian Corps of Signals in co-operation with the North West Territories and Yukon Branch of the Department of the Interior will establish the station this summer. As Herschel Island is the customs and immigration port for ocean vessels coming from Alaska, a sub-station will be installed there and operated during the season of open navigation.

veys in Ontario and Manitoba; photography for the compilation of Battleford, Victoria, Fort Assiniboine, Peace Hills, and Red Deer sectional sheets.

Forestry Branch.—Photography over forested areas in Maritime Provinces; vertical and oblique photography in the Petawawa forest reserve; patrols for the detection and suppression of fires over the forested areas surrounding lakes Winnipeg and Winnipegosis; continuation of the air patrols of the Crowsnest, Bow River, and Clearwater forest reserves.

Canadian National Parks.—Photography of historical sites in Maritime Provinces, Ontario, and Quebec; fire patrol for Waterton Lakes, Rocky Mountains, and Kootenay parks; photographic reconnaissance in unsurveyed portions of the Jasper Park area.

Water Power and Reclamation Service.—Photographs of power sites in Nova Scotia, New Brunswick, Ontario, Quebec, and British Columbia.

International Boundary Commission.—Photography of International Boundary in southern Manitoba and southern Alberta.

Ordnance Lands Branch.—Aerial survey of the Rideau canal.

Mr. F. R. Butler, Secretary of the Game Conservation Board of British Columbia, forwarded to Mr. J. A. Munro, Chief Federal Migratory Bird Officer for the Western Provinces, an aluminium band bearing the figure 21, but with no other inscription. This was taken from the leg of a blue grouse, shot on Raza island, British Columbia, by Mr. L. A. Schibler, of Church House, who asked to be advised of its origin. It is obviously a home-made band, apparently cut out of a sheet of aluminium with scissors or tin-shears. The figures are stamped in and show no abrasion.

Canadian production of copper, which was about 38,000 tons in 1913, increased to 60,000 tons in 1918. Since then the wartime capacity has not been called fully into play, although in 1923 and 1924 production exceeded pre-war figures, being 43,000 tons in 1923 and 53,000 tons last year.

Mount Armour situated on the International Boundary between British Columbia and Alaska, lat. 60° long. 139°, has an elevation of 8,776 feet. It is named after Hon. Mr. Justice John D. Armour, Chief Justice of the High Court of Ontario who was one of the original Canadian members of the Alaska Boundary Tribunal in 1903.

*Prepared from material supplied by the Department of National Defence, Canada.

TOWN PLANNING, ITS PROGRESS IN CANADA

Twenty-four Countries Represented at New York Conference—Application of Principles in Parks Work

The International Town, City, and Regional Planning Conference held this year in the city of New York, April 20-25 (the first time in America) was attended by delegates from twenty-four countries, including Great Britain, the United States, New Zealand, and Canada. Canada was represented by Mr. W. W. Cory, C.M.G., Deputy Minister of the Interior, and the Town Planning Institute of Canada by the President, Mr. Noulan Cauchon, of Ottawa.

Mr. Cory in his address recalled the fact that Charles Dickens once declared that he had systematically used his art to show the preventable wretchedness and misery in which the masses of the people dwell and had again and again expressed his belief that the amelioration of the living conditions of working people must precede all other reforms and that without this reform all others must fail.

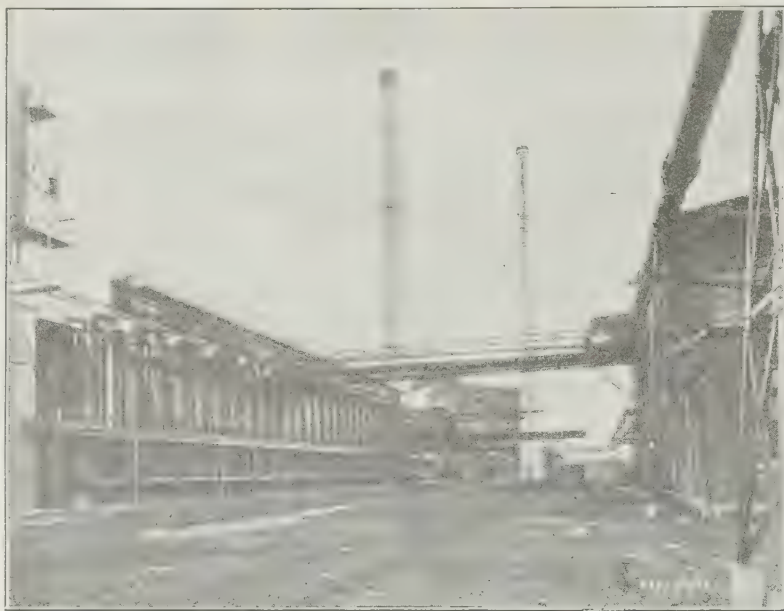
The science of town planning, said Mr. Cory, was based upon the desire to provide better home conditions for the less fortunately placed in life. Mean streets produce mean people. Our cities are more than centres of trade; they are, or should be, places where utility, comfort and beauty can be found; places where the poorest may find decent habitations and some charm in the business of living.

He believed that town planning held out the promise of improving the housing conditions of the people; it made for a city, planned and controlled in the best interests of all the various classes who compose its population. It was, he thought, a significant fact that chambers of commerce and boards of trade of the North American continent (composed, as they are, of hard-headed business men) were among the strongest supporters of the movement.

Mr. Cory briefly reviewed the progress of town planning in Canada and stated that of the nine provinces, seven had already passed town planning acts and that in the two others there was evidence of a very active interest in the subject. He gave special attention to that part with which he had been most directly brought into touch, the planning of improvements in the Canadian National Parks in the Rockies. The towns of Banff and Jasper, were, he showed, laid out to fit into and harmonize with their scenic settings, the plans of proposed buildings were passed upon to secure their suitability, and provision was made for broad streets, good water, lighting, and recreation facilities. In planning these and other town-sites in the parks, in laying out the roads and trails to give access to outstanding beauty spots, in the construction of the famous Banff-Windermere highway, and other improvements the principles of town and regional planning had been applied so far as possible and with the most gratifying results.

The production of aluminium from bauxite ore was carried on in Canada during 1923 at Shawinigan Falls, Quebec. Ten other plants, all in Ontario, fabricated aluminium products. The value of the total output from these plants was \$7,017,830.

Exports of gold ore, dust, etc., from Canada has risen from \$3,953,938 in 1922 to \$28,358,449 in 1924.



Coke as a Household Fuel—View of the plant of Hamilton By-Product Coke Ovens Limited showing the pusher side of the battery of ovens, with pusher and levelling machine, also delivery gas lines.

ISSUE REPORT ON COKE FOR HOUSEHOLD USE

(Continued from page 1)

national life of the country because within recent years the supply of this coal has been uncertain and will become more so as the resources become exhausted. In addition the price has shown a marked increase and the quality has gradually deteriorated.

"In searching for a solution to this unsatisfactory condition the Dominion Fuel Board concluded that the most promising field for investigation lay in the substitution of by-product coke for anthracite in the area affected. The Board consequently engaged the services of Mr. J. L. Landt, an engineer who has had wide and varied experience, not only in investigations of this kind, but in the building and operation of plants for the manufacture of by-product coke, to investigate the feasibility of establishing coke industries at various points in the "Acute Fuel Area" when conditions appeared to warrant such being done. In doing so, the Board felt that several objects might be accomplished, namely—the extension of the market for our own coals from the Maritime Provinces, relief from sole dependence on Pennsylvania anthracite, and the provision of a substitute fuel of equal quality but at a reduced price.

"The results obtained by Mr. Landt's investigations lead to the conclusion that all the objects indicated may be attained by the building of by-product coke ovens at points such as Montreal, Toronto, and other of our larger cities where the gas market is sufficiently large, and the accompanying report by him is presented with the hope and expectation that the data contained in it will be of value to those companies whose activities are concerned with the production and supply of fuel to the people of this part of Canada."

The inspection of silver black foxes, for registration purposes, is confined each season to about sixteen weeks commencing the middle of September. It is during this period that the quality of the fur can be judged. During the fiscal year 1923-24, about 10,000 foxes were inspected, tattooed in the ears for identification, and duly registered in the office of the Canadian National Live Stock Records. This brought the number of registered foxes up to more than 20,000.

SEISMOGRAPH IS INSTALLED IN SOUTHERN QUEBEC

(Continued from page 1)

some were pure inventions. The damage was not so much a function of the distance from the epicentre as of the nature of the ground and the character of the buildings. The major damages were at Quebec, Shawinigan Falls, Malbaie, St. Urbain, and the district near Rivière Quelle. They were in no case widespread or general, and applied in most cases to massive stone structures, without steel reinforcement, such as churches. Minor damages, such as falling of chimneys and breaking of windows, were somewhat more common. As the character of the ground was more rocky or the distance from the epicentre was greater the minor damages were limited to those caused by falling pictures, statues, bottles, etc. Where the damage was relatively serious the ground was found in every case to be sand or clay, usually on the side of a hill.

"As in the case of all earthquakes of any considerable intensity, the main shock has been followed by a series of minor ones which are still felt at intervals. Earthquakes have occurred before in this region, the last severe one about half a century ago. Now that the accumulated stresses have, in all probability, been relieved, there is no occasion to anticipate further serious disturbances during the present generation. As an insurance for posterity however, it would be well to pay some attention to location and methods of construction of new buildings. Where these are massive, and of stone or concrete construction without reinforcement by steel girders, it is preferable to have the foundation on rock or other solid substratum. Wooden or steel reinforced buildings are safe."

The production of zinc in Canada has steadily increased since pre-war times. The 1913 output was 2,800 tons. This was increased to 17,500 tons in 1918 and it is estimated that the 1924 production reached 49,000 tons.

Owing to the increasing traffic along the Mackenzie valley system of waterways, the Department of the Interior has for several years had parties of surveyors at work along the route, particularly in and above Great Slave lake. From these surveys, maps have been prepared which have proved most useful to navigators. Buoys, beacons and lights have also been put in place along the route.

GRADUAL INCREASE IN DAIRY PRODUCTION*

Substantial Gain in Output of Creamery Butter in Canada—Cheese Slightly Lower

The total dairy production in Canada during 1924 showed increases in keeping with the gradual upward trend which has been in progress for a number of years. From year to year there have been fluctuations in the relative amounts of the different products manufactured, due to variations in market values of these commodities, but on the whole the steady increase has been maintained. Naturally milk, to a certain extent, goes into that line of manufacturing most profitable to producers.

A preliminary report of cheese and butter production during 1924 compiled by the Dairy and Cold Storage Branch, Dominion Department of Agriculture, shows cheese production during that year to have been 150,245,131 pounds as compared with 151,624,376 pounds during 1923, a decrease of less than one per cent. This slight falling off was due to decreases in the provinces of Quebec and Alberta, all the other provinces showing increases.

With reference to creamery butter, the preliminary report shows the 1924 production to have been 182,161,347 pounds as compared with 162,834,608 pounds in 1923, an increase of 11.2 per cent. All the provinces with the exception of New Brunswick had increased outputs. The greatest rate of increase was in the Prairie Provinces, Saskatchewan coming first with a 25 per cent increase; Alberta, second with 20.3 per cent, and Manitoba, third with 17.7 per cent. Nova Scotia had 15.3 per cent rise and Quebec, 10.7 per cent. No report is yet available as to production of condensed and evaporated milk and milk powder.

During 1924 there was an increase in the quantity of fresh milk and cream exported as compared with 1923. In the last calendar year exports of fresh milk amounted to 2,896,279 gallons as compared with 2,132,765 gallons in the previous year. Shipments of cream out of Canada during 1924 totalled 3,288,822 gallons as compared with 2,668,747 gallons in 1923. Exports of condensed and evaporated milk during the calendar year just closed were 40,250,600 pounds as against 41,092,200 pounds in 1923, a decrease of 2.1 per cent. Milk powder exports reached 7,264,947 pounds in 1924 as compared with 4,975,838 pounds in the previous year.

*Prepared from material supplied by the Dairy and Cold Storage Branch, Department of Agriculture, Canada.

BENEFITS OF EGG GRADING

Egg grading in Canada has proved of great assistance for the export trade which now takes eggs in large quantities—2,711,460 dozens in 1924—with the assurance that they are as represented. The value of grading to the home market and to the industry is equally great, leading to a gradually increasing consumption. In 1901 the Dominion's consumption per capita was about 15 dozens. In 1921 it had risen to 21 dozens, and last year to 26 dozens per head. The Canadian people are now approaching a consumption of an egg a day and when this is reached about 270 million dozens will be required to meet it.

The Canadian output of lead has increased rapidly since pre-war times. In 1913 approximate production was 19,000 short tons, in 1923, 55,000 tons, and in 1924, 89,000 tons.

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CANOEING IN NORTHERN QUEBEC IS THRILLING

Lake St. John-Lake Mistassini Trip Appeals
to Adventurous Lovers of Outdoors

To anyone with a desire for adventure, a love of outdoor life, and a hunger for the unknown, the uncharted, and the hazardous, the canoe trip through northern Quebec from lake St. John to lake Mistassini will provide a never-ending source of satisfaction. There are trappers and prospectors who are familiar with the route but the outsider making the trip will need competent and experienced guides. These may be engaged through local outfitters who make a specialty of supplying guides and equipment for trips of this nature.

The trip starts from St. Felicien, the terminus of the Quebec and Chicoutimi branch of the Canadian National Railways, 206 miles north of Quebec city. The round trip has been made in 34 days, but 6 weeks' supplies should be taken as a precaution against delays from accidents or bad weather. The following description has been prepared from an itinerary of the trip made by Dr. A. Willey, Professor of Zoology, McGill University, during the summer of 1924.

From St. Felicien on the Ashuapmucuan river the first step of the journey was by wagon, 10 miles up the river, to avoid the lower falls and rapids. Entering the river the first camp was made at the Pemonka camp site, 9 miles up stream. A short distance above this point is a deep rapid called Pas de Ford or "No Bottom," which can rarely be ascended. It was necessary, therefore, to detour by the Stony River portage which crosses a chain of five charming lakelets and regains the Ashuapmucuan by a swift mountain stream. Next followed stiff poling up the White Spruce rapids to the foot of Chaudiere falls where camp was made. Above the falls the water is fast to the mouth of the Chigobish river which was reached on the fifth day. Turning west up the Chigobish, 15 portages were passed in the 22 miles to lake Chigobish, which is an attractive sheet of water with inviting beaches and surrounded by big, unburnt timber. Fifteen miles up the lake, Portage Dur leads to Crooked river, which is the extended foot of lake Ashuapmucuan. Nine miles up this latter lake is a newly established Hudson's Bay Company post of modest pretensions, so hidden among the trees that it cannot be sighted beyond a stone's throw. The first hundred miles of the trip was completed on the ninth day at the head of lake Ashuapmucuan and the ascent of the picturesque river Nikabau, with its long rapids, commenced.

WEMBLEY EXHIBITION REOPENS

CANADIAN DISPLAY IS MADE BIGGER AND BETTER FOR 1925 SEASON

The Empire Exhibition at Wembley was formally reopened for the season of 1925 by Their Majesties on 9th May in the presence of a great assemblage.

Designed as an exhibition to last for 1924 Wembley proved so vast and so instructive as to Empire conditions that it was decided to continue it for another season.

perishable exhibits not only for the sake of variety but also to make the display more complete and representative. Numerous important changes have been made in the exhibits in the industrial section. The crowds which visited the Canadian pavilion last year were so great that congestion of traffic occurred at certain points. To avoid this the



Wembley Exhibition Reopens—View of the Canadian pavilion looking from the northeast across the beautiful miniature lake.

The great plant housing the display has not, in the main, been changed, except where experience has shown increased facilities to be necessary to accommodate the crowds. The buildings have all been redecorated outside and inside and Wembley, as a whole, is more fairylike than when first opened. The Canadian pavilion, like the others, presents the same exterior but the interior is considerably changed. Perishable exhibits have all been renewed and changes and additions made to the non-

passages at these points have been widened and extra outlets provided so that crowds may keep constantly moving in one direction with comfort to all concerned.

It is expected there will be a large attendance not only of those who were unable to get to the exhibition last year but also of those who attended. There is so much to see and the exhibits have been so changed and added to that Wembley will be well worth a second series of visits.

Next comes a series of lakes beginning with Little and Great Nikabau, followed by Jourdain's and terminating in Branch lake, at the head of which Portage des Peches leads to Whitefish or Long lake. At the head of Long lake a portage called La Hauteur leads across the height of land between the Saguenay and the Nottaway drainage systems. From this point onward the trip gains in piquancy. Obatogamau, the next lake, contains 750 islands and the navigation of this labyrinth is difficult even for experts. The fourth portage after lake Obatogamau leads to a very narrow winding creek which is the head of lake Chibougamau. After passing through a succession of bays and narrows the latter lake was entered in the afternoon of the fourteenth day, completing 200 miles of the trip and coming within sight of the distant range of hills beyond which lies the great lake

Mistassini. Lake Chibougamau was crossed to its north end where the Narrows lead to Mackenzie bay, which is also called Baie du Jongleur from a flat-topped mountain at its head. From the head of the bay there is a hard portage to lake Wakonichi, crossing the watershed between the Nottaway and Rupert drainage systems. The rock-bound shores of Wakonichi lake offer but a slight inducement to land except at one spot called Pointe des Peches, a granite bluff, which is one of the best of all the camp sites and was reached on the eighteenth day. Descending Wakonichi river, lake Mistassini was entered and on the twentieth day the historic Hudson's Bay Company post on this lake was reached. Proceeding through Little Narrows, Abatagush bay and Big Narrows, the last camp was made at a place called Pointe des

(Continued on page 3)

CANADA IS THIRD IN SILVER PRODUCTION*

Dominion's Mines Are Greatest Producers
in Empire—1924 Output Twenty
Million Fine Ounces

About one-eighth of the world's annual silver production comes from mines within the British Empire. Canada's silver mines have been the greatest producers within the Empire for two decades. To-day she is the third largest producer in the world, being surpassed by Mexico and the United States, which together contribute nearly 65 per cent of the annual production.

Native silver was known to the American aborigines about lake Superior before the arrival of Europeans. Samuel de Champlain mentions the occurrence of galena on the east shore of lake Temiskaming, directly opposite and a few miles away from the famous Cobalt area of Ontario, but knowledge of the presence of silver is not recorded. Silver ores have since been found in Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, Alberta, British Columbia, and Yukon. The principal producing areas in order of their importance are Ontario, British Columbia, and Yukon.

Records of production have been kept since 1858. These records show a total recovery of 451,000,000 fine ounces to the end of 1923. Last year the recovery was slightly in excess of 20,000,000 fine ounces. The price of silver fluctuates from day to day; the highest yearly average recorded is \$1.35 per standard ounce 925 fine, and the lowest 51½ cents. The total market value placed on Canada's production during the years for which records are available is necessarily based on average market values from year to year. Between the years 1858 and 1923 the silver produced was valued at \$290,705,532; in 1924 the value was \$13,519,043.

The mines of Cobalt, South Lorrain, and Gowganda, all in the province of Ontario, are Canada's principal silver producers. Since the first discoveries in this area, about twenty years ago, the production has been close to 357 million ounces, or 79 per cent of the total recorded production since 1858. Present production is at the rate of nearly 9,900,000 ounces per annum.

Silver production in Yukon and in British Columbia is obtained from lead-zinc ores. Following the discovery of silver-lead-zinc ores in the Kootenay district a maximum production (5,151,333 ounces) in British Columbia was attained in 1901. Between 1906 and 1915

*Prepared under the direction of Dr. Charles Camsell, Deputy Minister of Mines, by A. W. G. Wilson, Ph.D., Mines Branch.

(Continued on page 2)

SASKATCHEWAN RIVER BORE ANOTHER NAME

Early Explorers Called Western River,
Pasquia—Differences In Naming
Branches

Saskatchewan is an Indian name meaning "swift-flowing" or "rapid," and although it is the name now borne by the great river which rises in Alberta and flows through Saskatchewan and Manitoba into lake Winnipeg, it was not its original name. Saskatchewan was given by the Indians to more than one stream. For example, it was an early appellation of the present Minnedosa river, in Manitoba, while Saskatchewanawa is the name of a tributary to Severn river, Ontario.

On a map showing the discoveries of the Vérendryes sent to France in or about 1750 the present Saskatchewan river is called Poskaiak. In his diary for this same year Legardeur de St. Pierre calls it the "rivière du Paskoya." Peter Pond on his map of 1785 has Pasquia. The name Pasquia which is now borne by a small tributary to the Saskatchewan river from the south at The Pas seems to mean "narrows between wooded banks" and to refer to the characteristics of the Saskatchewan river at that point, the only place for miles on either side where it is fordable.

The first map to apply the name Saskatchewan to the river is that prepared by Philip Turner of the Hudson's Bay Company in 1790. Turner applies the name to the North branch, but to the South branch he gives no name. However, he shows on the latter, "South Branch house," a Hudson's Bay Company trading post, the exact date of the foundation of which is not known. On the map prepared by Aaron Arrowsmith to illustrate Alexander Mackenzie's voyages published in 1901, the present North Saskatchewan river is called Saskashawin and the present South Saskatchewan is given the name South branch as far up as the junction of Red Deer river and Askow or Bad river, the present Bow river. The map prepared by G. Taylor from the observations of Peter Fidler, the Hudson's Bay Company surveyor, names the branches of the Saskatchewan river, North branch and South branch. David Thompson, who began his career in the Hudson's Bay Company in 1784 and transferred to the North West Company in 1797, applies the name Saskatchewan in his 1814 map to the river from the head of the North branch to the mouth of the Nelson river at Port Nelson. The South Saskatchewan he calls Bow river. In his writings Thompson applies the name Saskatchewan river to that portion of Nelson river between lake Winnipeg and Split lake. In doing so he follows the nomenclature of Nicolas Jérémie whose account of the Hudson Bay region published in Amsterdam in 1724 applies the name Quisquatchwen to this same portion of the Nelson river.

Present usage calls the two branches of the Saskatchewan, North Saskatchewan river and South Saskatchewan river as far as their junction, whence the combined waters are called Saskatchewan river as far as lake Winnipeg. There are many who think that it would have been less confusing to have carried the name Saskatchewan river to the head of the North Saskatchewan and to have continued to use David Thompson's name for the South Saskatchewan, namely Bow river.

CANADA'S FISH CULTURE SERVICE

Remarkable Strides Made In Development of the Work—
Inception and Present Extent of Service

Canada was the pioneer in the development of fish culture as a government service in the New World and the science in its modern and true sense had its inception in Lower Canada as early as 1856. The first Canadian fish culturist was the late Richard Nettle, of Quebec and Ottawa. He was appointed Superintendent of Fisheries for Lower Canada in 1857 and was given permission to resort to artificial propagation as a means of restoring the salmon fisheries of that province. His first experiments were with trout eggs secured in Jacques Cartier river and lake Beauport and these were the first artificially fertilized fish eggs successfully hatched in the Western Hemisphere.

Fish cultural operations as a Dominion Government service began in 1867, the Department of Marine and Fisheries assisting the late Samuel Wilmot in the work of collecting and hatching salmon eggs at Newcastle, Ontario. In 1868 Mr. Wilmot was appointed a fishery officer and the Newcastle hatchery was built by the Dominion Government. This appears to have been the first regular hatchery in the New World built and equipped at government expense. A very active interest was taken in fish culture about this time and officials from several of the American states visited the Newcastle hatchery to study the methods followed and equipment used. However it was not until 1871 that the United States Congress took the initial step towards a national fish-

ery service by creating the office of Commissioner of Fish and Fisheries. The propagation of fish was undertaken by the Commissioner the following year.

In 1883 a complete working section of the system of hatching in vogue in Canada at that time was put in operation at the great International Fisheries Exhibition in London, where it carried off the gold medal and diploma, the highest award for the best and most complete fish breeding exhibit. One other gold medal, two silver medals, and a bronze medal with the accompanying diplomas were also won by Canada.

The expansion with regard to the enlargement of the older hatcheries and the erection of new ones has been gradual and healthy. In 1876 there were seven hatcheries in active operation in Canada with a yearly output of over 9,500,000 fry. The forty-one Dominion Government establishments operating in 1924 distributed approximately 886,000,000 fry and older fish.

While Canada took a leading place in fish culture in its pioneer days in the Western Hemisphere, she was soon outstripped by the United States Federal Service in the number of hatcheries and the magnitude of distribution. However at the present time the Canadian Service is second to that of the United States only in the number of hatcheries operated and in the volume of distribution.

LARGE PROPORTION OF CROP WAS MERCHANTABLE

Ninety-five Per Cent of Wheat Yield Came Up
to Standard

Ninety-five per cent of Canada's wheat crop in 1924 has proved to be of merchantable quality according to figures compiled by the Dominion Bureau of Statistics. Of the total estimated crop of last year, viz., 262,097,000 bushels, 250,096,000 bushels came up to the standard as compared with 454,804,000 bushels or 96 per cent of the 1923 crop of 474,199,000 bushels.

Of the remaining crops the quantities in bushels and proportions merchantable are given in the following table:—

	1924	
	(Thous. of Bus.)	% of Crop
Oats	369,327	91
Barley	82,927	93
Rye	13,228	96
Buckwheat	10,320	90
Corn for husking	8,339	70
Flaxseed	8,850	91
	(Thous. of Cents)	
Potatoes	45,972	81
Turnips, etc.	35,480	87
	(Thous. of Tons)	
Hay, clover	13,362	88

It is interesting to note that the name of Swift Current the Saskatchewan river is derived from that of the Saskatchewan river.

INAUGURATE A NEW TRAIL TRIP THIS YEAR

"Steel-to-Steel" Journey Between Jasper
and Yoho National Parks Opens
Beautiful Scenic Area

The unexplored regions of Canada's National Parks are more and more proving a loadstone to the out-of-doors adventurers, explorers and nature lovers. Every season brings reports of some newly-explored area, attendant on the journeyings of individuals, or parties seeking access to the hidden wonders of remote districts.

The present season will witness the inauguration of an annual "steel-to-steel" trail trip which will serve as a link between Jasper and Yoho National parks, joining by pack pony the trans-continental lines of the Canadian National and Canadian Pacific Railways. The journey will also offer a means of opening this interesting and beautiful region, which forms the apex of the Rocky Mountains system in Canada, to a larger number of visitors. Although almost the entire journey is made over primitive trails through a mountain wilderness in all its primeval beauty, no insuperable difficulties are presented, and last year several adventurous women were members of a party which made the trip.

The route covered is about 200 miles and touches the practically unknown Whirlpool group of mountains between the angle of the Whirlpool and Athabasca rivers in Jasper park, the Columbia icefield and the Fortress Lake, Forbes, and Freshfield groups. The pack-train is scheduled to leave Jasper on the first of July, reaching Field in Yoho park, on the 25th of that month. The return trip over a period of 25 days will be commenced from Field on the first of August.

kenzie river from Edmonton and it is expected will reach the destination in good time. When these stations are completed messages will be sent out from and received regularly at Dawson, Mayo, Herschel Island, Aklavik, Fort Simpson, and Fort Smith. Edmonton is the southern terminus of the system. This will provide for the transmitting of messages in the Morse telegraph code and thus break up the long period in each year when it is not possible to communicate with this vast region.

CANADA IS THIRD IN SILVER PRODUCTION

(Continued from page 1)

there was a marked decline, but since the latter date there have been advances. The present rate of production is about 8,000,000 ounces per annum. In recent years a number of silver-lead prospects were located in Yukon and rich ores are being mined in the Mayo district, where the present rate of production is about one million ounces per annum.

Coleman glacier, at the head of Smoky river northeast of Mount Robson, Jasper park, Alberta, is situated in a part of the Rockies renowned for its scenic beauty. The glacier is named after Dr. A. P. Coleman, F.R.S., Professor of Geology in the University of Toronto, who traversed this region in 1907 and 1908.

TO EXTEND WIRELESS SYSTEM IN THE NORTH

Three New Stations Will Be Erected in
the Northwest Territories

Arrangements are now under way for the erection by the North West Territories and Yukon Branch of the Department of the Interior of three radio transmitting stations in the territories.

The first of these will be located at Fort Smith, which is just north of the southern boundary of the territories and which is also the administrative headquarters. Another will be erected at Aklavik. These are the standard sets of powerful instruments and will be used for all-year work. The remaining station, which will be on Herschel Island, will contain smaller and less powerful apparatus and will be used for reporting movements of vessels during the season of navigation. During the short season of navigation quite a number of steamers and sailing vessels call at Herschel Island, necessitating a good deal of custom-house, post office, and police work, and this station will keep the proper officers in touch with what is going on.

It will be remembered that last year the material for the Arctic station was shipped from Vancouver on the H.B.C.S. *Lady Kindersley* and that owing to this ship being caught and crushed in the ice this material was lost. This year the apparatus and fittings for the three stations will be sent down the Mac-

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OTTAWA, JUNE, 1925

FARTHEST NORTH SURVEYS

Department of the Interior Lays Out Plots at
Six Posts in Arctic Archipelago

Six different posts in the Franklin district of northern Canada have now been surveyed for the Royal Canadian Mounted Police or for trading companies, as one of the results of the 1923 and 1924 Arctic Expeditions under the North West Territories and Yukon Branch of the Department of the Interior.

Plans of these surveys are prepared by the Topographical Survey Branch from the surveyor's field notes for filing with the Registrar of the Northwest Territories. These surveys were made at Craig Harbour, Dundas Harbour, Strathcona Harbour, Ponds Inlet, Cumberland Sound, and Rice Strait, by F. D. Henderson, D.L.S. The last named post on Ellesmere island, being only 750 miles from the North Pole, is the most northerly point at which any official survey has ever been made.

SEED IMPROVEMENT IN CANADA*

Dominion Occupies a Foremost Place in This Important Work—Widespread Organization

Among the countries of the world, Canada occupies a foremost place in regard to her organization both for systematic seed improvement and for handling high class seed in commercial quantities under efficient control. Twenty years ago, the Canadian Seed Growers' Association was established, with headquarters at Ottawa, for the purpose of encouraging greater interest in the production and use of a better class of seed on Canadian farms. This association is composed of individual growers who operate according to certain regulations. There are now upwards of 4,000 of these men scattered throughout all the provinces of the Dominion, and their work is having a widespread influence.

While most of the actual breeding work is performed at the various agricultural colleges and experimental stations, yet there is a considerable number of the members who carry on selection work in one form or another, and who have contributed very materially to the improvement of the varieties commonly grown. Their work to-day, however, is largely that of multiplying the so-called "Elite Stock Seed" developed by the colleges and stations. These institutions realize fully that, if their work is to be productive of the greatest benefit to the country, their products must be used by those who grow crops. They realize furthermore that, in the absence of any definite system of control, their productions very quickly might lose their identity, or depreciate through becoming mixed with other sorts. They therefore welcome and encourage in every way the work of the association.

In a number of the provinces, subsidiary seed organizations have been established. Of these, the Alberta Seed Growers' Association is probably doing the largest business, although it has only been operating for two years. During this period, it has sold many thousands of bushels of wheat, oats, and barley, some of which have come as far east as Ontario. Very considerable quantities have also gone to the United States. The United States trade has received a very decided stimulus through the remarkable winnings of Canadian grains exhibited by members at the International Seed Exhibitions. In this connection it is interesting to note that practically every year since the inception of these International Seed Exhibitions, some fifteen years ago, the world-famous Marquis wheat, originated at the Experimental Farm, Ottawa, or a derivative of this variety, has won the grand sweepstake prize for the best hard spring wheat.

Thanks to the work of the various plant-breeding institutions, Canada now has at her disposal a very creditable assortment of varieties of grain. The old Red Fife wheat which first attracted the attention of the world to Canada as a producer of wheat of high quality, has been superseded by at least seven other varieties, both as regards yield and earliness of maturity. The Marquis wheat

just referred to occupies first place as regards total area grown. It is estimated that at least 90 per cent of all the spring wheat grown in Western Canada, and about 70 per cent of the spring wheat grown in the United States, consists of Marquis.

In Eastern Canada, Huron Ottawa 3 is now recommended and is grown to a considerable extent. Certain other promising varieties of wheat produced at the Experimental Farm, Ottawa, as well as at some of the provincial institutions are at present under investigation, and it is safe to say that some of these will find a place.

While steady and substantial progress is being made in the production and development of superior varieties of grains there is room for improvement. In the West, for instance, there is a need for productive, strong-strawed varieties of wheat of high quality which will either resist or escape the ravages of wheat-stem rust. A good deal of progress has been made in this direction already, and it is confidently expected that before very long varieties will be introduced which will be able to cope more successfully with this grave menace to successful crop raising.

CANADIAN AERIAL SURVEY AT WEMBLEY EXHIBITION

Exhibit Shows Rapid Progress Made In Applying
Aerial Photography to Surveying

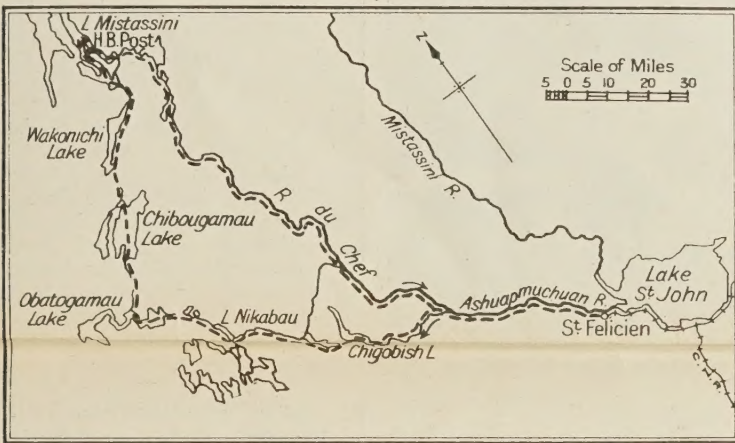
The British Air Ministry has invited the Government of Canada to prepare an aerial survey exhibit for the Empire Exhibition at Wembley during the coming summer. The request is particularly for a full detailed exhibit of the method used by the Canadian Government for plotting aerial photographs. The Topographical Survey, Department of the Interior, which is the central aerial surveying unit for the Dominion Government, has prepared in co-operation with the Royal Canadian Air Force, an exhibit which will show the rapid development in Canada of methods for practical application of aerial photography to mapping.

POPULATION AND USE OF POWER

Canada possesses minimum water-power resources of over 18,000,000 twenty-four hour horse-power distributed from coast to coast at advantageous sites near the centres of industry, and in the East and West enormous reserves of coal and other fuel.

That she is making use of her great power resources is shown by the facts that during the past ten years the developed water-power has increased from 1,936,000 horse-power to 3,570,000 horse-power or nearly 85 per cent, and the water-power developed per 1,000 of the population from 252 horse-power to 387 horse-power.

During these past ten years, while the population increased 20 per cent the use of power per head of the population increased nearly 54 per cent.



LAKE ST. JOHN TO LAKE MISTASSINI CANOE TRIP

Canoeing in Northern Quebec—Map showing route followed in the outward and return journeys between Lake St. John and Lake Mistassini.

CANOEING IN NORTHERN QUEBEC IS THRILLING

(Continued from page 1)

Chasses Sauvages du Printemps, in view of the vast expanse of the lake. As it was impossible to cross the open lake in small canoes the trip had to end here.

The return journey, commencing on the twenty-fourth day, was made by way of File-axe lake (lac le Meule) and the Rivière du Chef, which joins the Ashuapmucuan 33 miles above Chaudière falls, then down the latter river to St. Felicien, the starting point, which was reached on the thirty-fourth day.

DOUGLAS FIR

The Douglas fir (*Pseudotsuga taxifolia*) of British Columbia and the Pacific coast, often erroneously called "Oregon pine," is the only representative of its genus in Canada. It probably yields more lumber annually than any other single species in America. The tree in Canada is not found east of the Rocky mountains, the greater part of the lumber being produced in the coast region of British Columbia. This is Canada's largest tree, and from it larger structural timbers can be produced than from any other tree in America. It is used chiefly for structural purposes, but on account of its attractive appearance it is also used for interior finish. The wood is also important in Canada as a material for railway ties and mining timbers. It is noted chiefly for its strength and durability, and the large dimensions in which it can be obtained.

WHEN ANNUAL RENTAL WAS ONE BARLEY CORN

Old Records of Department of the Interior
Reveal Quaint Form of Nominal
Consideration

At the present day one is quite familiar with the expression "for the sum of \$1," or some similar phrase to indicate nominal consideration used in many documents conveying property. A recent search in connection with titles through some of the old documents preserved in the records of the Ordnance, Admiralty, and Railway Lands Branch of the Department of the Interior, revealed a quaint and rather curious form of this consideration. A lease issued under the authority of the province of Upper Canada in 1836 contained the following: "for and during the term of thirty years at a yearly rental of one barley corn." The usual item of nominal consideration in the early days was "a pepper corn" but this is the first case noted where "barley corn" was used. Possibly it was because barley was more common than pepper in this country.

The total production for Canada of commercial apples in 1923 was 4,493,183 barrels, valued at \$24,489,350. The corresponding figures for 1922 were 5,048,405 barrels of a value of \$24,692,182.

*Prepared under the direction of Dr. J. H. Grisdale, Deputy Minister of Agriculture, by Mr. L. H. Newman, Dominion Cerealists.

INCREASE IN PRODUCTS OF CANADA'S FORESTS

Estimated Value of Output Rises to \$197,459,331 in 1923—Growth of Industry

The importance of Canada's forest resources and the rate at which they are being exploited is shown in the recent estimate of the total primary forest production in the Dominion for 1923, made by the Dominion Bureau of Statistics. The total estimated value of all primary products of the forests is \$197,459,331, an increase of 15.6 per cent over the 1922 total of \$170,850,096. The extent to which the forests are being depleted in the process of exploiting can be seen in the estimate that the total primary forest production for 1923 involved the cutting of 2,671,054,862 cubic feet of standing timber. The addition of the volume of material destroyed by fire, insects, and other destructive agencies would bring the total drain on Canada's forests to more than five thousand million cubic feet per annum.

In the 1923 production logs and bolts for domestic manufacture—the raw material of the saw-milling and allied industries—again head the list of products for Canada as a whole with a total value of \$69,352,821. Pulpwood for use in Canada's pulp and paper mills comes second in point of value, with a total of \$43,594,592. Firewood with a total of \$38,723,272 stands third, and pulpwood for export follows with \$13,525,004. Railway ties were cut to the value of \$13,228,547.

The following tables show the primary forest production by provinces and by products for the year 1923:—

BY PRODUCTS—QUANTITY

Products	Unit	Quantity
Logs and bolts sawn.....	M ft. b.m.	4,097,720
Pulpwood used.....	cords	3,270,433
Firewood.....	"	8,975,480
Pulpwood exported.....	"	1,384,230
Railway ties.....	No.	14,764,830
Logs exported.....	M ft. b.m.	260,421
Square timber exported.....	"	143,105
Telegraph and telephone poles.....	No.	740,119
Round mining timber.....	M lin. ft.	65,218
Fence posts.....	No.	13,623,392
Wood for distillation.....	cords	56,310
Fence rails.....	No.	5,195,801
Miscellaneous exports.....	cords	176,426
Miscellaneous products.....	"	124,944

BY PRODUCTS—VALUE

Products	Value \$
Total.....	197,459,331
Logs and bolts sawn.....	69,352,821
Pulpwood used.....	43,594,592
Firewood.....	38,723,272
Pulpwood exported.....	13,525,004
Railway ties.....	13,228,547
Logs exported.....	5,095,163
Square timber exported.....	4,037,030
Telegraph and telephone poles.....	2,998,852
Round mining timber.....	1,615,667
Fence posts.....	1,423,478
Wood for distillation.....	540,541
Fence rails.....	444,189
Miscellaneous exports.....	1,723,683
Miscellaneous products.....	1,156,487

BY PROVINCES

Provinces	Equivalent volume in standing timber Cubic feet	Total value \$
Canada.....	2,671,054,862	197,459,331
Quebec.....	867,638,706	65,065,810
Ontario.....	725,269,084	58,813,733
British Columbia.....	550,927,540	40,815,407
New Brunswick.....	220,302,953	17,718,437
Nova Scotia.....	107,414,329	6,570,349
Manitoba.....	56,411,104	2,922,989
Alberta.....	77,755,075	2,754,014
Saskatchewan.....	50,387,169	2,132,220
Prince Edward Island.....	14,948,902	666,372

IN CANADA'S ALPINE GARDENS

Wildflowers of Exquisite Beauty and In Great Profusion Bloom in the National Parks

One of the great charms of the National parks in the Canadian Rockies is the variety and beauty of the wildflowers. At first thought one would perhaps not expect to find an abundant and interesting flora amid the higher altitudes but, strange as it may seem, the wildflower gardens which bloom above the clouds in the upper regions are among the most beautiful in the world.

favorite of Linnaeus. Higher still, in those grassy tablelands situated from 6,000 to 8,000 feet above sea level, the most beautiful and abundant flowers are found. Such places in early July are veritable seas of colour—great masses of blue, rose, white, yellow, and vivid green—through which one may wander knee deep. Still higher grow the heathers—rose, red, and white—covering the hills



Canada's Alpine Gardens—Picking purple phacelia at the foot of mount Assiniboine in Rocky Mountains National Park.

Over five hundred varieties have been identified by Dominion botanists, and their exquisite colour, fragrance, and delicate loveliness add the last touch to the charm of that wonderful region. Among the mountains there are plants peculiar to each particular locality and there are also hundreds of species which are found throughout all the various districts.

The time of blossoming depends on the altitude in which they are found, for spring in the mountains is a progressive season. In the lower valleys it comes about the end of April, and almost before the snow is off the ground the frail anemone will be thrusting its slender blade up through the chilly earth. On the higher slopes and in the alpine meadows which lie well above timberline, however, the snows may linger on into June, and in the very highest passes of all it may be almost July before the sun has removed the icy blankets of winter. Everywhere close upon the heels of the retreating ice the gay floral procession follows, and one of the interests of a climb to the higher altitudes is to observe the progression of the blossoming season. Flowers that bloom in the lower valleys in May will be found just opening six weeks later in the higher alpine meadows. By the time the tourists arrive in the park the gaillardia and the orange lily are setting the hills ablaze with colour. Later come the graceful zygadenes, the flaming Indian paint-brush and the white flowered service-berry. Higher up grow whole fields of phacelia, blue forget-me-not and gentian, the white woolly Labrador tea flower, the rhododendron and the exquisite pink twinflower that was the

with their thick blossoms. On the wind-beaten heights along the fringes of the eternal snows will be found little dwarfed plants, saxifrages and the frail everlasting, crushed down flat to escape the icy winds but with blossoms, unfurled bravely to the sunshine, crowding their whole life cycle into a brief summer of perhaps only six weeks.

In spite of their great abundance, in the immediate vicinity of the hotels the flowers have begun to suffer from thoughtless picking, and an appeal has been made to nature lovers in the parks to assist in protecting these exquisite creations which add so much to the beauty of our National playgrounds.

INVESTMENT IN CANADIAN WATER-POWER

The total water-power developed in Canada as at February 1, 1925, was practically 3,570,000 horse-power, and the capital invested therein, including transmission and distribution, was \$766,758,000. In 1910 the investment stood at \$121,000,000, so that the average annual increase over the 14 years has been nearly \$646,000 or 14 per cent per annum.

Mount Canning is situated on the International Boundary between British Columbia and Alaska, lat. 59°, long. 135° and reaches a height of 6,927 feet. It was named after the Right Hon. Geo. Canning, British Secretary of State for Foreign Affairs, 1822, who carried on British negotiations with Russia regarding the Alaskan boundary.

REGULATIONS

LARGER LEASEHOLDS FOR RANCHERS IN THE PRAIRIE PROVINCES

By Order in Council dated the 23rd of April, 1925, the Regulations governing grazing lands in the provinces of Manitoba, Saskatchewan, Alberta, and in the Peace River Block in the province of British Columbia were amended so as to increase the maximum area which may be leased for grazing purposes under these Regulations to 25,000 acres.

Since 1914 the maximum area which might be leased for grazing purposes from the Dominion Government in the Prairie Provinces has been 12,000 acres only.

REVENUES FROM THE FORESTS

Over eighty per cent of the timberland in Canada is owned by the Dominion or provincial governments, and the timber is disposed of almost entirely under licences to cut over definite areas for which an annual ground-rent and a royalty on the timber cut is charged. These licences are, for the most part, renewable annually, the governments reserving the right to alter the rates of rental or royalty and to impose such regulations as are deemed expedient. The direct revenue to the federal and provincial governments from the forests amounts to about \$12,000,000 annually, of which about \$4,500,000 is spent in protection and administration.

BEGIN FRY DISTRIBUTION

The 1925 distribution of fry in the lakes and streams of the Dominion was begun recently with the distribution of 80,000,000 young whitefish in the waters of lake Erie. The fish were produced at the Department of Marine and Fisheries' hatchery at Kingsville, Ont., and the distribution was made on selected grounds in the western end of lake Erie.

Canadian oats yielded in 1924 the total of 411,697,000 bushels from 14,491,289 acres, as compared with 563,997,500 bushels from 14,387,807 acres in 1923.

The total yield of potatoes in 1924 in Canada is estimated at 56,648,000 cwt. from 561,628 acres, as compared with 55,497,000 cwt. from 560,942 acres in 1923.

The total stand of timber in Canada is estimated to comprise 482,000 million feet board measure of saw material, and 1,280 million cords of pulpwood, fuelwood, posts, etc., a total of 246,826 million cubic feet. Of this, 108,946 million cubic feet is in the Eastern provinces, 56,423 million in the Prairie Provinces, and 81,657 million in British Columbia; but British Columbia has 70 per cent of the saw material in the Dominion.

Bismuth was reported for the first time in Canada's mineral production for 1924. This metal occurs in the silver-cobalt ores in small quantities, and in their treatment it is allowed to build up in the lead and silver bullion until it reaches a marketable percentage. Shipments of this metal reported for 1924 amounted to 12,863 pounds valued at \$16,079.

